

# THE IRON AGE

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## Tolerances in the Rolling of Steel Sheets

Causes of Variations from Gage and Reasons for  
Current Practice Presented from the  
Mill Standpoint

BY "MILLMAN"

JUDGING from the amount of discussion we hear and the differences of opinion expressed, the matter of variations from gage in both weight and thickness of iron and steel sheets manufactured by the hot rolling method is one that might be better understood by a great many consumers.

The consumption of hot rolled sheets in their many finishes amounts to perhaps a tenth to an eighth of all iron and steel products produced in this country and their value is greater than that of any other iron or steel product except pig iron and ingots. It would appear, therefore, that all factors affecting the uniformity of the product of such a vast industry, factors that cannot be absolutely controlled, should be explained and a mutual understanding reached.

The actual variation in weight or thickness of sheets from those given in the United States standard gage table is perhaps responsible for more misunderstanding and consequently a greater number of complaints and claims than any other single condition of the material. Flat and corrugated sheets are nearly always sold by the manufacturer on the per 100-lb. price basis. The purchaser, whether fabricator or jobber, frequently disposes of them on a basis other than weight, and therefore is vitally interested in the gage variation. If the sheets are heavier than gage the profit is reduced; if lighter, there will be an increase in profit providing the product is not too light to be acceptable.

Sheets rolled lighter than gage are not as productive of complaints as are those rolled heavier than gage. As a result it would be perfectly natural for manufacturers to make the variation on the side of lightness, but usually they do not do this unless so ordered. When purchasers order that sheets be rolled light to gage the manufacturer is immediately confronted with the necessity of aiming at a mean weight somewhat less than that corresponding to the nearest gage. As a result the weight aimed at becomes the gage ordered and the sheet will not finish within what may be considered the

permissible variation from the gage nearest that ordered. Sometimes this is a cause of misunderstanding. If we consider the methods employed in manufacturing hot rolled sheets and also the several transforming processes through which the metal must pass from the ingot to the bar, we may be less inclined to wonder why they cannot be made more accurate in weight and thickness than to marvel that human hands and ingenuity, in spite of all the difficulties, can create so uniform a product.

### Beginning with the Sheet Bar

One of the first steps is to make a sheet bar from which to roll the sheets. Usually two sheets of 24 gage and lighter are made from one bar, but rarely, except in very short lengths, can more than one sheet of a heavier gage be made from one bar. Bars 8 in. wide are invariably used in making sheets 14 gage and lighter. The length of the sheet required governs the thickness of the bar and the width of the sheet governs the length of the bar. When a bar has been rolled into as nearly as possible the size and weight of sheet required, both sides and both ends of the sheet will be irregular, ragged and tapered to an almost knife edge. This is due to the metal, which, while being rolled in a red hot state, is being squeezed out just as a batch of dough would be under a rolling pin. It is necessary to shear off these sides and ends and have the dimensions after shearing approximately equal (not scant) to the dimensions of the sheet ordered. The entire lot of sheets of each size must also average in weight, when ordered by gage number, an amount approximating the United States standard gage table weight of an equal area.

### Determining Bar Size

The loss sustained by shearing the sides and ends is known as hot mill scrap loss, and although its percentage is greater on small sizes and less on large

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*WHAT the buyer of steel gets is sometimes not precisely what he expected—this is because he is not acquainted with limitations of mill practice. Some of these practical matters are not covered in the special literature of the industry and are learned only by long experience. The accompanying article is accordingly welcome as a needed contribution on the commercial as well as technical phases of an important branch of the steel business. The author, drawing from a wealth of first hand information, has promised to write other articles of similar import and corresponding value.*

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sizes it is estimated to average about 14 per cent of the weight of the sheet before shearing.

When ordering sheet bars the weight of the finished sheet is first estimated by using the United States standard gage table and adding a sufficient percentage to cover the estimated hot mill scrap loss. This is factor No. 2 affecting weight and thickness.

To illustrate: If the sheet to be made is 20 gage 24 in. wide by 96 in. long it should weigh 24 lb. and the bar should weigh about 28 lb. The bar would be made 8 in. wide by 25½ in. long. It is rolled sideways on the sheet mill and must be long enough to make the width of the finished sheet plus the side scrap, and thick enough to make the length of the sheet plus the end scrap.

The bars are made as carefully and as accurately as possible, but it is not practical to make them to the exact weight required, because the only way of reducing the weight and thus changing them from a larger piece of metal to the dimensions wanted is by reducing the width and thickness by rolling; consequently the weight of the bar is ascertained by measuring the thickness. When the bar is measured it may be just a little too thick and because of this, if given another pass through the rolls may, in spite of all possible care, be made a little too thin and too light. This affects the weight and thickness of the sheets—factor No. 3.

#### Hot Mill Rolling

In either event the bar is made and brought to the hot sheet mills where it is reheated in pair furnaces and started through the rolls. These rolls become very hot as a result of having hot bars pass through them continually and are subject to a considerable expansion, especially in the center, which gets the hottest. To keep this expansion from producing a convex surface on the rolls, which would result in the center of the sheets being much thinner than the edges and perhaps also in breaking the rolls from uneven pressure, the latter are machined to a slightly convex surface. This expansion is another factor affecting the variation in weight and thickness of sheets.

At the hot sheet mills the thickness and weight of the sheets are determined and regulated by measuring their length with a rod as often as may be necessary. It is not practical to measure the thickness as at the bar mill, because they are not rolled singly as are bars but are rolled in pairs or packs. One pass too few will result in sheets being too heavy and perhaps too short, and the next pass may make them too thin and consequently too light—factor No. 5 to be reckoned with in controlling gage variation.

Many sheets in the finish wanted require to be bar pickled or sheet pickled or both, and to be highly cold rolled. Since these pickling processes by removing scale from the metal also remove weight, this amount of weight must be predetermined and added to the weight of the sheet bar required—factor No. 6 affecting gage variation.

#### Cold Rolling

The surface of a sheet is made very largely by the amount of cold rolling given and it is not always possible to predetermine accurately the number of passes the sheet must have through the cold rolls. Cold rolling elongates the sheets and thus reduces the thickness and the weight per square foot. An allowance is estimated and made for this elongation, when shearing the ends at the hot mill; but as a result of the cold rolling the thickness and weight per square foot may be seriously affected—factor No. 7 affecting gage variation.

It would seem that these factors or conditions (and they are not all) are of themselves sufficient to justify a more liberal weight variation than that which exists.

The United States standard gage is a weight gage established many years ago by Congressional enactment. It has been standardized by usage rather than by law and has gradually superseded almost entirely Brown & Sharpe gage, Birmingham wire gage, British standard gage and any other gages that were once frequently used. The decimal equivalents shown in the United States standard gage table are those of wrought iron, which has been determined to weigh 0.2778 lb. per cu. in., while rolled steel weighs 0.2833 lb. per cu. in.

The table, therefore, is somewhat confusing, since wrought iron has been almost entirely superseded by rolled steel. This confusion would not exist, however, if one would dissociate the decimal equivalents from the weights when ordering rolled steel.

#### Reasons for Over-Size

Assuming that the percentage variations agreed to by manufacturers of hot rolled steel and iron sheets are practicable and are to govern the rolling of the sheets, let us consider some other factors which cannot be avoided and which the purchaser should recognize when determining whether the material received is a good delivery in this respect.

Since a cubic inch of rolled steel weighs 0.2833 lb. and a cubic inch of wrought iron weighs 0.2778 lb. the former is 2 per cent heavier than the latter. Sheets are first sheared at the hot mill and not again unless ordered re-squared or ordered in smaller sizes than those in which they are rolled. Unless ordered re-squared they cannot be cut accurately to size by hot mill shearing, due to the fact that the sides and ends are irregular as a result of hot rolling and they are not very flat, as they have not yet been annealed or cold rolled. Sheets that are scant to size ordered are not a good delivery, so that an effort is usually made to shear a little over-size. An average over-size of ¼ in. in width and ¼ in. in length is considered good mill practice. The over-size on some of the large sheets may average a little more. This average over-size represents

1.6 per cent of a 30 in. x 96 in. area

1.8 per cent of a 24 in. x 96 in. area

so that when comparing the actual weight of a lot of sheets of any given size with the United States standard gage weight the actual area of the lot should be ascertained by measurement rather than, for example, by assuming that the area of a not re-squared sheet ordered 30 x 96 in. is 20 sq. ft.; it will probably be a little more.

#### Manufacturers' Schedule of Variations

American sheet manufacturers have agreed that the following variations shall be permissible when sheets are ordered to weight per square foot:

16 gage and heavier, 5 per cent plus or minus  
17 gage and lighter, 2½ per cent plus or minus

and that these variations shall apply to the total weight of each lot (all of a gage and size) in each shipment and not to each individual sheet. It is easy to understand that small selected lots as sold from a jobber's floor may or may not be representative of the weight of the entire lot, because some sheets will be bound to vary in thickness and in weight more than others.

Bundles are usually weighed and the weight marked thereon after being banded. Bands will average about 1 lb. each and from two to three are placed around each bundle, thus adding at least 1.2 per cent to the theoretical weight of the sheets. Therefore, hot rolled one pass cold rolled box annealed sheets or galvanized sheets loose may weigh heavier than theoretical weight, when ordered by weight, due to the following factors:

	Per Cent
17 gage and lighter, allowable variation.....	2.5
17 gage and lighter size variation, ¼ x ¼ in....	1.6
Total variation.....	4.1

without any allowance for variation in scale weight.

Hot rolled one pass cold rolled box annealed or galvanized sheets bundled may weigh heavier than theoretical weight, due to the following factors:

	Per Cent
17 gage and lighter, allowable variation.....	2.5
17 gage and lighter, size variation, ¼ x ¼ in....	1.6
17 gage and lighter, weight of bands.....	1.2
Total variation.....	5.3

Therefore, 17 gage and lighter one pass cold rolled box annealed or galvanized loose sheets, when ordered by weight, may weigh 4.1 per cent heavier than theoretical weight and yet be considered within the allowable variation; and 17 gage and lighter banded sheets may weigh 5.3 per cent heavier than theoretical weight and also be considered within the allowable variation.

By the same method of calculation, 16 gage and heavier loose sheets may weigh 6.6 per cent more than



theoretical weight and when banded 7.8 per cent more than theoretical weight. As a matter of fact they do not average to these upper limits, because some are light, thus offsetting the heavy ones, and the purchaser thus gets an advantage.

To the above variations, which are entirely reasonable, should be added, when sheets are ordered to decimal thickness, the 2 per cent difference in weight between wrought iron and rolled steel, in determining the permissible weight of common black steel sheets.

#### Full Pickled and Cold Rolled Sheets

Carefully made tests show conclusively that full pickled, full cold rolled sheets weigh at least 2 per cent more than do common black sheets of the same thickness. The reason for this is perhaps chiefly that the former has had the scale removed and surface irregularities smoothed. Scale is much lighter than steel, consequently when it is removed the weight of the sheet is not decreased in proportion to the reduction in thickness. Two or three passes in the cold rolls will fill up the pores and pits created by pickling, thus again slightly reducing the thickness by pressing the surrounding metal into them, without reducing the weight.

Therefore, is it not reasonable to assume that the maximum variation might easily be approximately as follows:

##### *One Pass Cold Rolled, Box Annealed or Galvanized*

- 16 gage and heavier, loose, ordered to weight, 6.6 per cent; ordered to thickness, 8.6 per cent.
- 16 gage and heavier, banded, ordered to weight, 7.8 per cent; ordered to thickness, 9.8 per cent.
- 17 gage and lighter, loose, ordered to weight, 4.1 per cent; ordered to thickness, 6.1 per cent.
- 17 gage and lighter, banded, ordered to weight, 5.3 per cent; ordered to thickness, 7.3 per cent.

##### *Full Pickled, Full Cold Rolled*

- 16 gage and heavier, loose, ordered to weight, 6.6 per cent; ordered to thickness, 10.6 per cent.
- 17 gage and lighter, loose, ordered to weight, 4.1 per cent; ordered to thickness 8.1 per cent.

These sheets are seldom ordered bundled.

When sheets are ordered by gage number they are rolled as near as possible to the weight per square foot corresponding to that gage number. When they are ordered by decimal thickness, as are a great many full pickled, full finish sheets, they are rolled as near to the

decimal thickness as possible, and as a result they will average heavier per sq. ft. than if rolled to weight.

No kind of a sheet, whether wrought iron, rolled steel or full pickled, full cold rolled and annealed, need be any heavier per sq. ft. than any other if ordered by and rolled to weight, as the difference would be in thickness only. But if rolled to decimal thickness wrought iron would be the lightest, rolled steel next and F. P., C. R. and A. steel would be heaviest per sq. ft.

#### Further Cold Rolling

Additional cold rolling in excess of three passes reduces weight and thickness nearly in the same proportion. The pits and pores having been filled, the metal under pressure having to go somewhere necessarily flows.

A full pickled, full cold rolled sheet made to a decimal thickness that is determined by the usual method—namely, using short jawed calipers—will weigh from 1 to 2 per cent more per sq. ft. when ordered not resquared than when ordered resquared. This fact is due to a feathering of the edge in cold rolling, similar to though not in the same degree as the knife edge produced in hot rolling.

Thickness determinations made along the edge of the sheet will average a little thinner if taken before resquaring than after. While this does make a difference sheet manufacturers do not make it a basis of claim.

When in ordering a sheet the gage is indicated by decimal thickness then the individual sheets may be calipered.

A variation of 0.003 in. on either side of a 20 gage (0.0375 in. thick) sheet still leaves it a good delivery, yet that represents 8 per cent of the thickness of the sheet as ordered and 8 per cent of its weight. Therefore, we can easily see that individual sheets, if rolled to decimal thickness, may be much heavier or lighter than the average of a lot of sheets rolled to weight.

Several of the factors influencing the weight and thickness of a sheet are just as liable to bring it on the light as on the heavy side of the gage. As a result, the average weight and thickness of all sheets should be somewhat less than that ordered plus a reasonable variation, although the chances are that it will come somewhere on the plus rather than on the minus side.

## ABRASIVES AND GRINDING

### Modern Grinding Equipment and Machinery Discussed at Engineers' Meeting

At the second annual dinner of the Engineers' Club of Bridgeport, Feb. 7, modern abrasives and grinding machinery were discussed by W. N. Wagner of the engineering staff of the Norton Co., Worcester, Mass., and an inspiring talk on the development of grinding machinery and the contribution of that machinery to modern industry was given by Charles H. Norton, designer and consultant for the Norton Co. The two addresses were made at the plant of the Bridgeport Brass Co., after the dinner and election of officers had taken place at the Hotel Stratfield. Joseph H. Bentley of Bentley & Holmgren, consulting engineers, is the new president of the club, succeeding Carl F. Dietz, president Bridgeport Brass Co.

Mr. Wagner's talk, which was made largely in the nature of a demonstration with different kinds of abrasives, showing their values on different metals and other materials, was devoted largely to the production and uses of abrasives of various kinds. The influence of the bond was traced as an element in determining speed and character of cutting. The way in which the crystals of the abrasives break and tear away under the friction of their work was explained, and sample wheels were used to cut various materials, thus showing how each type of wheel is suited to a different type of work. In making spark tests, it was shown how various kinds of ferrous and non-ferrous metals heat up under the influence of grinding.

Mr. Norton's talk, which was largely reminiscent,

detailed many of his early struggles in obtaining acceptance of machines for precision grinding, his constant fight against sabotage and ignorance, prejudice and that "know it all" attitude which has proved the block over which many inventors have fallen. He estimated that the Ford car would cost \$50,000 to build, if the present accuracy of parts now obtained by means of precision grinding were to be obtained in any other way. He pointed out that, to reduce the diameter of a pin or shaft  $\frac{1}{4}$  of 0.001 in., the axis of the grinding wheel is moved toward the axis of the piece being ground by a distance equal to one-eighth the thickness of tissue paper, and that modern machines for this purpose not only can make this minute movement accurately, but can repeat it with equal accuracy as often as called upon.

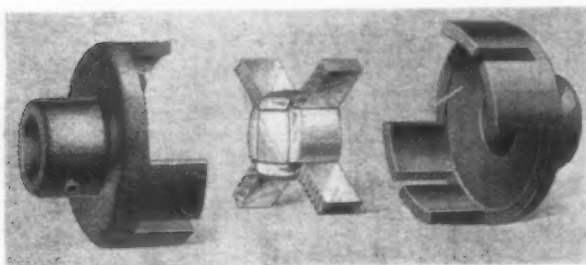
The Interstate Commerce Commission, in a decision recently in the case of the Fort Wayne Rolling Mill Corporation, Fort Wayne, Ind., ordered the rate on bar iron from Fort Wayne to Sheboygan, Wis., in carloads, reduced from 32c. to 26.5c. per 100-lb., effective March 20. The commission reaffirmed a previous decision holding that the rate was not unreasonable prior to Jan. 1, 1923.

A safety code for the use, care and protection of abrasive wheels, a tentative American standard of the American Engineering Standards Committee, is available in pamphlet form as bulletin No. 338 of the bureau of labor statistics of the Department of Labor and obtainable on application to the Government Printing Office, Washington.

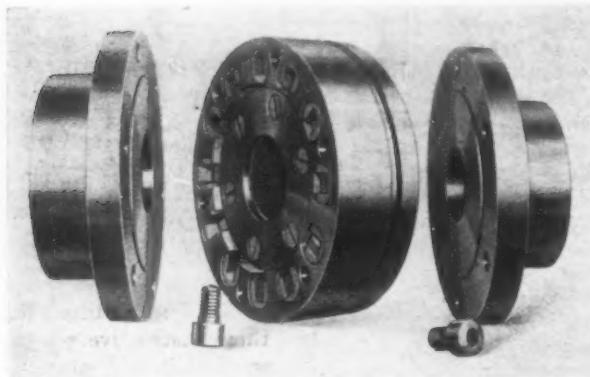
### Two New Flexible Couplings

Flexible couplings of high-speed type and pressed-steel type, respectively, the latter for fractional horsepower drives, have been added to the line of Francke couplings offered by Smith & Serrell, Newark, N. J.

The high-speed coupling consists of two similar forged steel flanges, which are attached to the shaft ends in the usual manner. Between these flanges and bolted to them is a center flexible member, as shown in the accompanying illustration. Laminated spring construction is employed, which is claimed to provide flexibility and to be durable. The keepers in the outer member of the laminated spring can rotate as well as slide endwise in this outer chamber. Thus the bearing



Three-Part Pressed Steel Flexible Coupling for Fractional Horsepower Motor Drives



Flexible Coupling for High-Speed Service. Accessibility for inspection and repair is a feature. Laminated spring construction is employed

between the bundle of springs and the keeper is constant, providing a surface bearing rather than line or point contact. The bundle of springs can slide in a vertical or horizontal direction, providing flexibility in all directions.

The flexible member may be installed or removed simply by withdrawing the bolts from the flanges, without moving either of the connected machines. The coupling may also be lined up conveniently, using a straight edge across the flanges. For low-speed work grease lubrication may be employed, the coupling being designed to retain grease. For high-speed turbine work oil lubrication is recommended, and means for continuous lubrication with clean oil has been provided. The coupling has been made in sizes rated to transmit up to 200 hp. per 100 r.p.m. and to operate up to 3400 r.p.m.

The pressed-steel coupling, also illustrated herewith, is for shafts up to  $\frac{3}{4}$ -in. in diameter and for fractional horsepower motor drives up to 1 hp. at 1800 r.p.m. It is a three-part, all-metal flexible coupling, made up of two similar pressed steel flanges and a center spring cross as shown. It is flexible in all directions and may be extended endwise. Smaller bores are obtained by using inserted bushings or in large quantities by drawing hub and bore to required diameters.

### Pennsylvania Railroad Operating Motor Truck Service

Motor truck service has been put into operation by the Pennsylvania Railroad. Store-door delivery of less-than-carload freight is the ultimate objective of the Pennsylvania Railroad, according to R. C. Wright, general traffic manager. This railroad has worked out three plans for the use of motor trucks in handling less-than-carload freight as follows:

1. Elimination of package local or peddler train, motor trucks serving intermediate stations between zone stations, zone stations being served by "destination cars."
2. Establishment in large cities of break-bulk points away from congested terminals, and transfer of freight by motor truck from such break-bulk points to city stations inbound and outbound, doing away with trap car service.
3. Door-to-door pick-up delivery to and from break-bulk points, or store-door delivery.

### Drill for Heavy Underground Work

A water jet hammer drill designated as the DW 64, and intended for tunneling, drifting and heavy underground drilling for which a mounted machine is desirable, has been placed on the market by the Sullivan Machinery Co., Chicago.

The new machine weighs 130 lb. and may be operated as a one-man drill. It is rated to handle  $1\frac{1}{4}$  in. hollow steel on holes 12 to 18 ft. deep, and is said to be notably free from vibration. In soft, broken or fitchered ground it clears itself well and produces a true hole, and in hard rock maximum drilling speed is said to be obtained.

The valve and piston motion is a feature emphasized, the differential three-spool independent valve employed in the company's rotators being used to control the action of the machine. Front and rear end cylinder cushions are provided to prevent damage to the drill and impart smooth running. The machine has combined water and air jets for cleaning the hole and laying dust, separate control for each being provided. Automatic rotation of drill steel and automatic differential pressure lubricator are features. The chuck is of the inclosed dust proof type and is made in two parts, with separate locking ring for the steel. All parts with the exception of the retaining bushing and rifle nut are of steel. The small clearance required for the machine is a feature.

### To Reduce Types of Forged Tools

WASHINGTON, Feb. 11.—Recommendations that 526 types of forged tools be reduced to 364, through the elimination of unnecessary types and sizes, were being considered today at a conference under the auspices of the division of simplified practice of the Department of Commerce. The recommendations, adopted by the Forged Tool Society, representing approximately 90 per cent of the forged tool manufacturing capacity of the United States, affect the tools of railroad construction workers, miners, road builders, builders, lumbermen, masons, blacksmiths and farmers.

Among the representatives of manufacturers, distributors and consumers to meet for a study of the program were: H. P. Sheets, Indianapolis, Ind., representing 23,000 retail hardware dealers; T. James Fernley, Philadelphia, representing the National Wholesale Hardware Association, and John A. Donnan, secretary Southern Hardware Association, Richmond, Va.; Arthur B. Clunan, J. G. White Engineering Co., New York, representing the National Association of Purchasing Agents; the Champion Tool Co., Meadville, Pa.; Evansville Tool Works, Evansville, Ind.; Heller Brothers Co., Newark, N. J.; Hubbard & Co., Iron City Tool Works and Klein-Logan Co., Pittsburgh, Pa.; Fayette R. Plumb, Inc., Philadelphia; Stanley Works, New Britain, Conn.; Warren Tool & Forge Co., Warren, Ohio, and Warwood Tool Co., Wheeling, W. Va.



# Future of General Commodity Prices

Moderate Advance Appears Imminent, as One of the Reactions  
of Comparatively Short Duration in the Fundamental  
Downward Trend in the Years to Come

BY GEORGE E. ROBERTS

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**MR. ROBERTS**, who is vice-president of the National City Bank of New York and Editor and Supervising Director of the American Chamber of Economics, was the author of "What 1924 Promises for American Business" in *THE IRON AGE* of Jan. 3. As supplementing that article and answering a question everywhere asked, the present contribution undoubtedly will be as welcome and as well received as was his analysis of the prospects of 1924.

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GENERAL commodity prices, in years to come, may drift back to approximately their pre-war levels, for by that standard of measurement prices are still high. They have been made high, however, by conditions wholly without the pale of speculation, conditions which essentially are sound, and which probably will not undergo any rapid change. The return of general prices to the old normal, then, will be a very gradual procedure and probably require a relatively long period of time.

Now during this long period of recession and readjustment the currents and cross-currents of industry and finance, nationally and internationally, are likely to set up reactions of comparatively short duration to this fundamental trend of prices which appears to be gradually downward. Indeed, factors of economic importance indicate by their present trends that they are now slowly acquiring strength and that they will soon be components of just such a reaction, and that a moderate advance in the general price level appears to be imminent.

## Factors Favoring a Rise

The economic stage is set for a movement of this very nature. During the last half of 1923, according to the all-commodity index of the Bureau of Labor, commodity prices, viewed as a unit, moved within a range of 4 points. For all practical purposes such a movement approximates stability. But actually, this stability has been confined to the relatives of the all-commodity index, and to it alone, for the components of this index, the various groups of commodities themselves, have moved in a wide range of values. Taking 1913 as a base, the farm products group of the Bureau of Labor's index, for example, fluctuated about 10 per cent; the fuel group's range was 56 per cent; the textile group's 12 per cent, and the building materials group's was 26 per cent.

In all of this shifting of values the persistent firmness and strength of raw materials—pig iron, steel, lead, wool, raw cotton, corn and wheat—have been outstanding. During the same period wages have held stubbornly to their post-war heights, and in some trades have moved still higher. Now it is important to note that, while raw materials have been strong and while labor costs have been high and inelastic, the prices of finished products—consumers' goods—as a class have not gained correspondingly.

Business has been active and the turnover of merchandise has been in good volume, but profit margins have been narrow and largely because the markets for

finished goods have been heavy. The placing of orders has been slow, and retailers have shown little concern about anticipating their future requirements. The uncertainty of moving merchandise at higher prices has made them timid and cautious about buying except for immediate needs. In the meantime, the manufacturer has curtailed his production, and has been waiting for the rise in the price of his finished product which would make his margin of profit a little more comfortable for his operations.

The generally light inventories, common to almost every line of business, likewise favor a moderate rise in prices. Stocks of merchandise on hand have become light chiefly as a result of the lesson a great many business men learned back in 1920 and 1921, and of the common practice of the past two years of purchasing only for one's immediate needs. Confidence in future values is strong, and if the price of listed stocks may be cited as an index, this constructive sentiment is steadily gaining in the degree of its optimism. The opinion seems warranted, then, that evidences of strength in commodities markets will result in a wave of buying that is likely to initiate a moderate advance in the general level of prices.

Moreover, wages are high and unyielding, and with raw materials generally in a strong price position, there is a point beyond which general commodity prices, and particularly the prices of consumers' goods, cannot fall, if the product is to be forthcoming at all. This condition lends strength to the contention that prices generally cannot go lower, unless there is a corresponding movement in raw materials and wages, and the immediate outlook favors an advance in both.

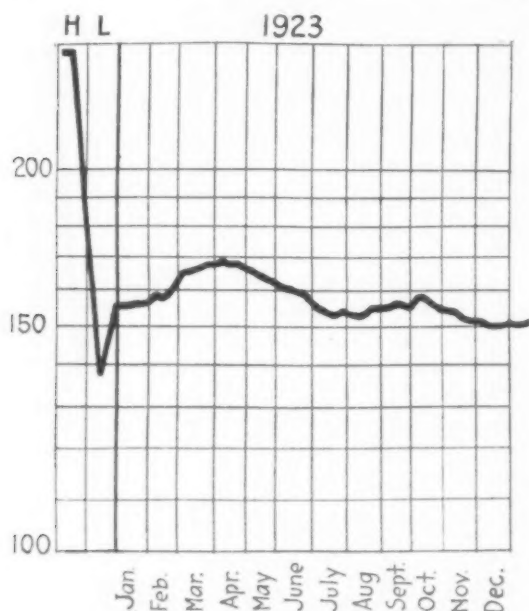
Employment is full, although it has been working into a more comfortable position than prevailed last spring. Wages, according to the New York State Department of Labor, have a strong undertone and are at their highest point since 1920. With the necessities of life appreciating in value, a strong prospect for a moderate rise in general prices, the outlook favoring a busy spring, and with labor already fully employed, a readjustment in wages is not to be expected and, really, a further rise in labor costs is not improbable. If wages do rise, and if the present narrow profit margin is to be preserved, prices must rise.

The stock market, the acknowledged barometer of the financial and industrial future, in its almost steady rise of some 10 points, on the average, since October presages a spring of active and profitable business. Inasmuch as a moderate rise in the price of general

commodities is necessary to insure a more complete prosperity than has prevailed up to the present time, and inasmuch as a period of industrial acceleration is usually attended by rising prices, the suggestion of a moderate advance in the various commodity markets is confronted from still a different point of view.

#### Easy Money and Our Gold Reserve

Perhaps the most powerful agent of a rising price level is the abundance of credit and easy money. A slump in prices has never occurred in the economic history of this country when interest rates have been low, the banking structure fundamentally sound, and credit in good supply. Since the middle of December the early liquidation of agricultural and industrial loans has exercised a repressive influence upon the money market. Further pressure has been exerted by



Course of Commodity Prices During 1923, With the Record High Point *H* Reached in May, 1920, and the Record Low Point *L* Reached in June, 1922. The basis is 1913 at 100 and Prof. Irving Fisher's index is used.

the final settlements, disbursements and transfers which always occur at the close of the year. Speculative and investment requirements, although increasing, have been only moderate, and not sufficiently large to employ the funds released by commerce, industry and agriculture. As a result, rates have sagged. Loan accounts of member banks have receded slightly, and their deposits have correspondingly increased. Paper rediscounted by the Federal Reserve banks has declined notably since the first of the year, and the reserve ratio for the system is at a remarkably high level.

The abundance of credit indicated by these trends has been augmented by our already huge and growing stock of gold. Every banker and economist in Europe is watching for inflation in the United States and expecting it to result from our importations of gold. The greater part of the new gold being produced in the world is coming to the United States. Our net imports last year were approximately \$300,000,000 and the year before \$240,000,000 and since the beginning of the war we have more than doubled our gold reserves. The accretions are continuing—several millions more since the beginning of the new year. The recent additions are practically idle, because reserves are ample and loans are not increasing. Loans are not increasing because the public is timid, warned by experience and afraid of debt. Meanwhile, Europe is watching to see how long the American public will abstain from that most enticing intoxication of all indulgences, the use of cheap money.

They say abroad that there is only one outcome to this situation, that in the end the flow of gold to the United States will break down interest rates to the point where the public will borrow, that inflation will come and drive up prices until the balance of trade turns against the United States so heavily that gold will flow the other way. They say that that is the only way in which equilibrium can be restored.

Paul Warburg, late of the Federal Reserve Board, in an address at the annual meeting of the International Acceptance Bank, Inc., of whose board of directors he is the chairman, sounded another warning against this danger. He said that we should regard these abnormal gold reserves as far in excess of our own needs and actually a menace to business stability; that we should regard them as not merely reserves for our own use but world reserves, for the support of foreign monetary systems, for stabilizing the foreign exchanges, and for the reestablishment of normal industry and trade throughout the world. That unquestionably is a sound view. At least we should abstain from using this gold ourselves and from making it the basis of credit.

Once the gold is here, however, it is difficult to control its use. It comes in the form of private remittances, enters into private bank deposits, and is subject to private control. Neither our reserve banks nor other banks can safely extend credits at home or abroad on the basis of these holdings. The truth is that it would be better if this flow were stopped. It is not a factor of strength but of weakness. It is coming partly in consequence of disordered conditions abroad, partly in payment of foreign indebtedness, partly in consequence of our trade policies, and it would be better to shape our national policies so far as practicable to aid in restoring the international equilibrium. In that way will we best promote our own prosperity.

#### Unfavorable Elements

But there are factors in the present economic situation that are unfavorable to a pronounced rise in general commodity prices. The purchasing power of consumers, taken as a broad class, is still unevenly distributed. This condition has grown out of the widespread redistribution of wealth and income that occurred during the war and in the post-war period of readjustment. The organized workman and the owners of some of the more profitable enterprises in the more active industries have received the lion's share of the increase in income that has taken place since the war. The farmer, the salaried men, and the owners of enterprises in the industries where business has not been so profitable, have suffered to just the extent that the more fortunate classes have gained. Some progress toward a more equitable distribution was made in 1923, but purchasing power of the masses still presents a spotty aspect. This condition will probably not interfere with the consumption of goods, as long as employment continues full, but this very inequality will probably manifest itself later in the form of consumers' resistance, if the general commodity price level undergoes a pronounced rise. It cannot be said definitely that this factor is sufficiently powerful to forestall a moderate advance, but buyers' resistance may be expected to grow with the degree of the price advance.

Another unsatisfactory feature of the present good times is the exaggerated and wholly abnormal relationship that exists between the exchange value, or the purchasing value, of the various commodity groups. Before the war a farmer was able to say that so many bushels of corn bought so many pairs of shoes, and this relationship in values remained relatively constant. An equilibrium had been established. This equilibrium

(Concluded on page 546)



# Call on Industry for War Preparedness

## War Department Plans Complete Up to Factory Door—

### Some of the Things Asked of Manufacturers

#### —Standard Contract in Preparation

**P**REPAREDNESS plans as provided by Congress in the National Defense Act of 1920 have been completed by the War Department for industrial mobilization up to the factory door. That the War Department cannot go beyond that point without the sympathetic cooperation of the manufacturers themselves was emphasized at a dinner arranged by the New York sections of various engineering societies and the Army Ordnance Association, held at the Hotel Commodore, New York, Feb. 5.

The direct purpose of the dinner, the addresses following which were on the topic of "Industrial Preparedness as Insurance Against War," was to bring to the manufacturers, through the engineering profession, the story of what has been done and to tell them what further cooperation is required. More than 850 persons attended, and the addresses were broadcast by radio. The societies represented included the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, Society of Automotive Engineers, American Institute of Electrical Engineers and the American Society of Civil Engineers. Elbert H. Gary, chairman of the board, United States Steel Corporation, presided.

It was made clear by the various speakers that the man-power mobilization plan as provided for in the act has been completed, and that the industrial mobilization which would provide rifles, ammunition, airplanes and other equipment has progressed to the point where a complete program of the quantities of finished articles required has been prepared. A standard form of contract with manufacturers is also in process of preparation. As the plans now stand, however, the man-power mobilization would be months ahead of the supply of the necessary manufactured articles.

The bringing of the requirements of the national defense plans before the industrial establishments of the country is put as the next step, to insure the maximum quantity of supplies in the shortest time in the event of an emergency.

Col. Dwight F. Davis, Assistant Secretary of War, reviewed the object and progress of the national defense plans, pointing out that they are based solely on a conception of the minimum necessary for national security. "The plans," he said, "are based on the defense of all the people by all the people. In our man-power plans we rely on a citizen soldiery. Our industrial mobilization plans are fundamentally democratic." The problems which confront a nation at the outbreak of a war were compared to those faced in starting a new manufacturing business.

"A nation must plan in advance for the mobilization of its man power, must have on hand a minimum supply of equipment for immediate use, and must have a plan for the prompt utilization of its full industrial resources. This is not militarism, it is just common sense," said Col. Davis.

#### Progress Made in Mobilizing Industry

Considerable progress was said to have been made in the work of industrial mobilization, which has been under way for over three years. The steps taken in the planning work were outlined in part as follows:

"The first thing to determine is—'What will we need?' Our requirements are based on the man power mobilization plan of the general staff, which informs us how many men will be called into service month by month—what articles and equipment they will require and other similar details. Using this as a basis the seven supply branches have figured their requirements.

"This sounds like a simple task, but when you realize

that they must be figured for some 700,000 different items month by month in varying quantities, for varying purposes, you can realize that it is not as simple as it sounds.

"If this first step alone had been taken before the last war it would have saved literally billions of dollars and would have eliminated much of the confusion in efficiency and waste which characterized the early period of our entry into the war.

"The next question that arises is, 'Where can we get these articles?' This involves practically a survey of the industrial resources of the country, and that survey is now in process. In order to decentralize the work the country has been divided into fourteen procurement districts, and in time of war each procurement branch will have a branch office in each district. In many cases prominent business men have been asked to serve as branch district chiefs, and their advice and assistance have been invaluable.

"Without going into details, the final goal of this planning work, which, of course, can never be quite reached, would be that upon receipt of a telegram from my office every manufacturer who is to do war work would go to his safe, take out his production schedule, plans, specifications, contracts, etc., and immediately start to work."

It was pointed out that problems of importance to industry necessarily arise as the plans develop and that after figuring the requirements in finished articles it is necessary to break them up into various elements, such as raw materials, power, labor and transportation, all of which require thorough study. In these studies the War Department is getting hearty cooperation from leaders in industry, engineering and science and from committees of engineering societies. In this connection it was said that the American Iron and Steel Institute, through Judge Gary, has offered to put all the resources of the steel industry at the disposal of the War Department in working out their special problems.

The difficulties presented in making plans for the production of ordnance in the event of war were vividly outlined in an address by Col. James L. Walsh, chief of the New York Ordnance District.

As an indication of the magnitude of the ordnance problem it was stated that at the time of the Armistice the aggregate ordnance effort was consuming every month labor and raw material equal to the entire cost of the Panama Canal. In addition to the difficulties presented by the magnitude of the ordnance problem, another complication pointed to was that there is no large industry already built up for the prompt manufacture of ordnance in an emergency. All other preparations can take place faster than the manufacture of arms and ammunition, which, therefore, sets the pace at which the country can make ready to wage war.

#### Rapid Change of Weapons a Complication

Complication due to the rapid change of war weapons was discussed at length, and in this connection was mentioned the ordnance tractor of the Holt Mfg. Co., having a speed of 30 mi. per hr., and negotiating a 45 deg. slope as compared with the caterpillar tractor for divisional artillery with a speed of 12 mi. per hr., previously considered ideal. The largest aerial bomb effectively used during the war, weighing 400 lb., was compared to the bomb ten times as large developed within the year. Other examples in guns and rifles of recently increased capacity were cited. Changes of design are being provided for and also the increased employment of the various types of weapons adopted as standard.

Requirements as to accuracy of manufacture and in

terchangeability were cited as other perplexing characteristics of the ordnance problem, and in this connection it was said that failure to live up to established limits of accuracy is one very effective way of siding with the enemy.

The extensiveness of the ordnance plans were reflected in the part of Col. Walsh's address which emphasized the need of expert advice on the power situation in the vicinity of New York. This is wanted because in placing tentative contracts which call for increased facilities it is desired that the necessary power can be had when needed. It was brought out also that during the war there were not sufficient heat-treating facilities to take care of the shell program as projected. Col. Walsh said that it was desirable to know whether that situation has improved in this vicinity and what the future promises in that direction. "We would like to know," he said, "whether it is practicable to standardize metallurgical practice within the district, and if so, what steps can be taken now to bring it about in the event of war."

The question of available transportation was discussed and advice invited as to plans for taking advantage of motor truck transport to relieve congestion of the railroads. Labor, financial and other problems affecting quick mobilization were briefly dealt with, and it was stated that help was needed to the end that the plans shall be fundamentally sound and workable if put to the test.

#### Suggests Ordnance Committees in Factories

A suggestion made was the forming of ordnance committees from the younger executives within manufacturing plants. On this Col. Walsh said: "Give it a dignified and honorable status, publish it in the house organ. Let this group think the thing over, give them ready access to the older officials for advice and counsel. Let them decide what new buildings or alterations

are necessary, list the new equipment necessary and ascertain if it is readily available. Let them make their own shop layout and sketch out their routing sheets for work in process. Help them draw up bills of material and discuss the source of labor supply. Ask them where they are going to get the capital if additional funds are needed. Put the problem up to them and see what they can do." Gen. John J. Carty, vice-president American Telephone & Telegraph Co., discussed industrial preparedness from the standpoint of the industries.

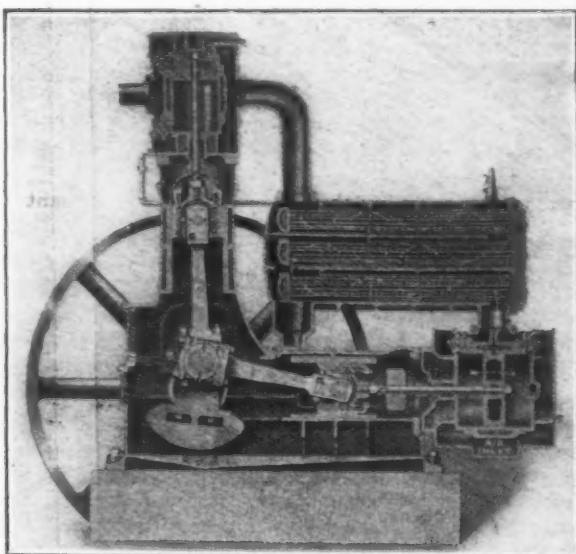
Commenting on the legal form upon which contracts for manufacture would be made, it was said that a vital part of this contract yet to be worked out is the basis upon which the costs of manufacture should be established. In the preparation of cost accounting data, the industries, it was said, can make helpful suggestions. It is intended that a form of cost accounting should be adopted which would be fair to all parties concerned, which would set at rest all questions of profiteering, and which would have the approval of public sentiment.

"By the direction of H. B. Thayer, president of my company," said Gen. Carty, "I am now at work upon the subject with the authorities at Washington, and the Western Electric Co. is cooperating actively with a view to determine as definitely as possible in advance the probable emergency demands of the army and navy. These will be coordinated with the probable civil demands, so as to minimize as far as possible the disastrous effects of a war upon this vital industry."

It was emphasized by the speaker that American industries as a whole have nothing to gain by war, but everything to lose. By cooperating with the Government in making industrial preparedness plans all that we can hope to accomplish from an immediate business point of view is to minimize the appalling losses to industry which are caused by the economic dislocation produced by war.

#### Improves Angle-Compound Compressor

The Sullivan Machinery Co., Chicago, has incorporated "wafer" air valves and the three-pass counter current intercooler as features on all sizes of its angle-compound belt-driven class WJ-3 air compressors. These machines are built in seven unit sizes, having a



Wafer Air Valves and Three-Pass Counter Current Intercooler Are Features

range in single machines from 450 to 1700 cu. ft. per min. free air, and in the twin unit up to 3700 cu. ft. They are employed for working pressures up to 120 lb.

"Wafer" type valves are used for both intake and discharge, on both low and high-pressure cylinders.

These valves are actuated by the air pressure itself and do not derive their opening or closing movement from any mechanical action of the compressor. They are of improved construction and arrangement, and designated as the double wafer valve.

The inlet and discharge valves are seated in pairs in tandem, one pair in each port. Each valve and valve seat is a separate unit, which may be removed without being taken apart. The valves themselves, of standard wafer design, consist of thin alloy steel flat rings resting on carefully ground seats of the same shape. They are fully automatic and are held in their seats by air pressure and returned after opening by annular springs. One spring is used on each inlet valve, and two, nested together, on the discharge valves. Valve seats and valves are removed by taking off the hand covers and unscrewing two nuts.

The intercooler, of the "three-pass, counter-current" type, consists of a cast iron shell divided into three compartments containing copper or aluminum tubes, providing sufficient surface to produce thorough cooling of the compressed air. It is mounted immediately over the lower pressure cylinder and frame and is provided with flanged inlet and outlet openings, and cast iron flanged connections to the air cylinders. The inner end of the intercooler is supported by a hollow leg to form a trap into which water or oil will drain, to be blown off by a drain cock provided. A pop safety valve is mounted on top of the intercooler.

The ends of the tubes providing the cooling surface are expanded into headers. The outer header is bolted against a packed joint on the outer end of the intercooler body, and the other header inside the intercooler body is left free to move with the expansion and contraction of the tubes. By removing bolts holding the outer header the three nests of tubes with the headers may be removed for inspection or repair. Removable covers on both header tubes give access to the ends of the tubes for removal of sediment or insertion of new tubes.



# Lubrication of Grooved Bearings

## Two Theories Analyzed—Boundary Lubrication Considered the Condition in Reciprocating Machine Parts

GROOVES in bearings for efficient lubrication is a question regarded as settled by Dr. T. E. Stanton, director of the National Physical Laboratory, England; and chairman of the lubrication committee of the department of scientific and industrial research, who delivered the result of painstaking researches in a lecture before the International Air Congress in London. Dr. Stanton states as the result of his research that:

"Using an ungrooved journal and an ungrooved bearing, with castor oil as the lubricant, it was found that steady conditions could be obtained, but that the coefficient of friction was 15 per cent higher than with the grooved surfaces and that substituting a grooved journal for the plain one did not improve matters. In the case of the Bayonne oil, the increase in friction due to using ungrooved surfaces was 22 per cent.

"It is clear, therefore, that a system of grooving is essential to obtain the minimum friction due to the materials of the surfaces and lubricant employed."

Particular stress was laid on the value of adding small quantities of organic acid to mineral lubricating oils, on which phase of the question *Engineer* of London comments: "The insufficiency of the Reynolds theory is in our opinion presented by the known effect of adding small quantities of fatty acid to mineral lubricating oils. According to the hydro-dynamic view, the nature of the lubricant is immaterial, its viscosity alone affecting the result. Yet to take some figures recorded by Dr. Stanton, figures which are amply borne out by practical experience, the addition of 1 per cent of organic acid to Bayonne oil, an amount insufficient to have any noticeable effect on the viscosity, reduced the coefficient of friction in a bearing by no less than 17 per cent."

"In laying the foundation of the theory of steady lubrication," said Dr. Stanton, "it must be confessed that engineers have taken little part, and the modern conception of its action is, in the main, due to the advances which have been made in the domain of physical chemistry with regard to the molecular phenomena occurring at the surfaces of solids and the manner in which films of foreign matters are condensed on these surfaces by the process known as adsorption.

"It is now recognized that solid surfaces having an adsorbed layer of lubricant of only one molecule in thickness can slide over each other with comparatively small frictional resistance. Further, it is known that adsorption is dependent upon the chemical constitution of the lubricant and that the greater the work done in the process of adsorption, the less the frictional resistance of the surface to sliding. Acids, alcohols and esters are more strongly adsorbed by water than are paraffins, and it is found that the former are better lubricants than the latter.

"There are, therefore, two essential different kinds of lubrication:

"In the one the surfaces are separated by a film of lubricant many hundreds of molecules in thickness, so that the resistance to relative motion of the surfaces is due to the lubricant in mass and the effect of the reactions at the two interfaces of lubricant and solid surfaces is negligible.

"In the other the molecular reaction at the common boundary constitutes the whole of the resistance, which is therefore a function of the nature of the surface and the chemical constitution of the lubricant.

"In the former case the frictional resistance is determined by the viscosity of the lubricant and by the relative speed, configuration and attitude of the rubbing surfaces.

"In the latter case it has been found by Prof. W. B. Hardy (Cambridge, England), to whose researches on this kind of lubrication much of the existing knowledge of the subject is due, that the coefficient of friction under these conditions may be written  $\mu = \mu_0 - \frac{aM}{\dots}$  where  $M$  is the molecular weight of the lubricant and  $a$  is a constant depending on its chemical constitution,  $\mu_0$  being a function of the friction of the surfaces when chemically clean.

"Mr. Hardy has also shown that in this kind of lubrication, which he has termed boundary lubrication, the friction for a given normal pressure between the surfaces is independent of relative speed and area of contact.

"An attempt was made to imitate the conditions of pressure and arc of contact of surface in worm gears in a cylindrical journal and bearing in continuous relative movement. The tests showed clearly that although pressure of 3.5 tons per sq. in. between the surfaces, and arcs of contact of 14 deg. were obtained, the lubrication was undoubtedly that of the Reynolds type, since it was possible to measure the pressure of the oil film and its distribution by means of a Bourdon gage connected to a hole in the bearing. In this test the least thickness of the oil film was found to be 0.000046 in., which corresponds to a film of, roughly, 5000 molecules thick.

"It thus appeared evident that the existence of boundary lubrication depended on factors other than those of pressure and area of contact.

### General Conclusions

"Results of pendulum experiments show that by means of this comparatively simple apparatus the characteristics of lubricants and bearing metals under conditions of boundary lubrication can be investigated rapidly and conveniently. The experiments also show, in a manner which does not seem to have been demonstrated before, that in general engineering practice the lubrication of all machine details in which the relative motion is of a reciprocating character may be taken as boundary lubrication, and that consequently in such cases improvements in efficiency due to the addition of organic acids to the lubricants employed will be realized.

"On the other hand, whenever steady relative motion of the rubbing surfaces can be maintained, it would appear to be possible, by the use of a suitable lubricant and correctly proportioned surfaces, to set up a condition of film lubrication of the Reynolds type with all the advantages which this system affords.

"Further, the vexed question of grooves in bearings, which has given rise to so much controversy, may now be regarded as settled. It was found by Beauchamp Tower that the presence of an oil groove in the crown of a bearing effectively prevented the formation of an oil film. It has now been demonstrated that in reciprocating motion a liberal amount of grooving to give the oil access to all parts of the bearing surface is necessary for efficient boundary lubrication."

The committee studying gage steel will meet in Washington, Feb. 16, at the Bureau of Standards to discuss among other things the following: Review of the experimental work on the effect of heat treatment; development of wear test; report of service tests of gages; possibilities for improving gages, and plans for future work. H. W. Bearce, Bureau of Standards, is secretary of the committee.

## IRON ORE SHIPMENTS

### Tonnage Moved from Lake Superior Ranges Shows Large Increase Over 1922

The shipments of iron ore from the Lake Superior district in 1923 total 60,780,003 tons, according to the compilation just completed by *Iron Trade Review*. This amount added to all prior shipments from the time of the opening of the ranges shows the complete record as 1,134,525,937 tons—a billion tons of which has been shipped in the last 25 years.

Shipments in 1923 exceeded those of 1922—43,990,096—by 16,789,907 tons. They were the largest since 1918, in which year the total was 62,836,172 tons. In only two other years, during the war period, were the

out of the high-tax areas. Lower Union mills contains three bar mills, 9-in., 12-in. and 15-in.; a sheared plate mill and 7 steam hammers. It has an annual capacity of 80,000 tons of merchant bars, 48,000 tons of sheared plates and 2000 tons of forgings.

### American Brake Shoe & Foundry Co. Buys Control of National Car Wheel Co.

PITTSBURGH, Feb. 11.—Controlling interest in the National Car Wheel Co., Pittsburgh, which has been held by James D. and George P. Rhodes, has been secured by the American Brake Shoe & Foundry Co., New York. The car wheel company, which is the second largest producer of cast iron railroad car wheels

IRON ORE SHIPMENTS BY RANGES, GROSS TONS

	1923	1922	1921	1920	1919
Mesabi .....	41,814,463	28,055,394	16,350,696	37,149,277	31,997,699
Marquette .....	3,892,666	2,817,390	1,116,468	4,608,323	2,992,212
Menominee .....	4,854,781	4,078,519	1,584,404	6,562,106	4,442,868
Gogebic .....	6,579,950	6,219,610	2,336,493	8,763,332	6,230,839
Vermillion .....	1,278,598	1,211,467	869,313	1,007,435	929,049
Cuyuna .....	2,220,745	1,497,615	488,562	2,191,528	1,861,165
Mayville-Baraboo .....	138,800	110,101	52,413	129,571	92,819
Total .....	60,780,003	43,990,096	22,798,349	60,411,572	48,546,651

SHIPMENTS BY PORTS AND ALL RAIL, GROSS TONS

	1923	1922	1921	1920	1919
Escanaba .....	5,607,411	4,592,354	1,806,656	7,361,070	4,963,358
Marquette .....	2,789,285	1,976,220	786,946	3,415,108	2,132,935
Ashland .....	6,237,449	5,813,207	2,264,705	8,180,852	5,915,383
Two Harbors .....	6,418,464	5,952,437	3,286,338	9,278,464	6,424,545
Superior .....	17,820,476	11,234,240	4,991,278	14,812,398	10,919,965
Duluth .....	20,163,619	13,044,771	9,164,803	15,479,334	16,821,209
Total by lake .....	59,036,704	42,613,229	22,300,726	58,527,226	47,177,395
Total by rail .....	1,743,299	1,376,867	497,623	1,884,346	1,369,256
Total .....	60,780,003	43,990,096	22,798,349	60,411,572	48,546,651

tonnages greater than that of 1923. In 1917 the total was 64,437,003, and in 1916 it was 66,658,466.

The Lake Superior district supplied approximately 85 per cent of all the iron ore used in the manufacture of pig iron in the United States in 1923. The Oliver Iron Mining Co. (Steel Corporation) shipped 46.19 per cent of the Lake Superior ores.

More ore was shipped from the Oliver's Hull-Rust pit in 1923 than in any prior year and more than from any other mine in any year. The shipments totaled 8,823,879 tons, larger than all shipments from any of the other ranges. For comparison, the total from the Menominee range was 4,854,781 tons; from the Marquette, 3,892,666 tons; Gogebic, 6,579,950 tons; Cuyuna, 2,220,745 tons and Vermillion, 1,278,598 tons.

The Mesabi Iron Co., which built a large magnetic concentrating plant on the Mesabi range, shipped 83,525 tons in 1923, which with the 10,676 tons forwarded in 1922, makes a total of 94,201 tons, since the beginning of its commercial operation. The Henry Ford Imperial mine on the Marquette range shipped 211,302 tons in 1923 compared with 73,083 tons in 1922.

The Lake Superior Iron Ore Association has issued a statement of ore shipments identical with that of the *Iron Trade Review* except as to ore lost in transit and left in dock at upper ports. On account of this difference in the method of compiling statistics, the total shipments shown by the association is 60,798,526.

### Will Dismantle Old Mill

Lower Union mills, Carnegie Steel Co., Pittsburgh, built in 1861 and 1862, and which represents Andrew Carnegie's first venture into the steel industry is to be dismantled. This plant, located on Twenty-ninth Street and Allegheny Valley Railroad, Pittsburgh, is on leased ground and the company some time ago decided not to renew leases of the land occupied by this and other so-called city mills and has made no expenditures on them other than were absolutely necessary. It is probable that other city units will be abandoned as leases on the land expire, it being the desire of the company to get

in the country, was formed in 1903 by the consolidation of the Keystone Car Wheel Co., Pittsburgh; the Rochester Car Wheel Works, Rochester, Pa.; the Cayuta Wheel & Foundry Co., Sayre, Pa., and the Maher Wheel & Foundry Co., Cleveland. The sale also includes the Pennsylvania Casting & Machine Co., a subsidiary located in Pittsburgh.

Representing the new ownership, these officers have been chosen: William F. Cutler, New York, president; George M. Judd, secretary; Joseph B. Tarbell, chairman board of directors; Andrew Muerhead, Pittsburgh, treasurer. C. M. Bower, Frank C. Turner, J. H. Yardley and E. H. Chapin, New York, and J. F. Weisbrod, Pittsburgh, are vice-presidents.

Messrs. Rhodes hereafter will devote themselves exclusively to the Castalia Portland Cement Co., Castalia, Ohio, which they control.

### Higher Tariff on Australian Products

WASHINGTON, Feb. 12.—Instructions have been sent to collectors of customs by Assistant Secretary of the Treasury Moss to assess an additional duty equal to the net amount of a bounty which Australia has provided for the manufacture in Australia of fencing wire, galvanized sheets, traction engines and wire netting. The Treasury Department took its action under section 203 of the Fordney-McCumber tariff act. The Australian bounties are £2 12s. per gross ton on fencing wire and galvanized sheets and £3 8s. per ton on wire netting, while those on traction engines range from £40 to £90.

A safety code for the protection of industrial workers in foundries has been drawn up under the sponsorship of the National Founders' Association and the American Foundrymen's Association. In pamphlet form, as bulletin No. 336 of the bureau of labor statistics of the Department of Labor, it may be obtained on application to the Government Printing Office, Washington.



# Cause of Red Stains on Sheet Brass—II

## Influence of Furnace Conditions Analyzed—Diverse Effects of Gases and of Flames During Annealing Are the Main Causes of the Trouble

BY E. A. BOLTON\*

IT has been held that the red stains observed in works practice are due to irregularities of conditions in the annealing furnaces. There is considerable variation of opinion as to the exact conditions which give rise to the staining, but the theories have been advanced that the staining is due to

- (a) The furnace gases having a reducing character, and thus allowing ready volatilization of the zinc.
- (b) The presence of sulphur dioxide through the use of a coal rich in sulphur.
- (c) The impinging of smoky flames onto the metal during annealing.

**Effect of Gases.**—Five brasses, of the compositions given in the table, were used in the experiments, and annealings were carried out in the following gases: Carbon dioxide, a mixture of equal volumes of carbon dioxide and carbon monoxide, carbon monoxide, water vapor (and air) and hydrogen.

In carbon dioxide only very slight staining occurred in a few experiments. In carbon monoxide there was only slight tarnishing, and indeed it was proved that previously existing stains could be removed by heating the specimens in carbon monoxide. No staining was obtained in the mixture of carbon monoxide and carbon dioxide.

Considerable staining occurred in the experiments with water vapor, but both air and liquid water were present, so that there is no analogy between these experiments and the annealing in dry steam carried out in some works to prevent staining. No staining occurred on heating the brass in hydrogen, and previously existing stains could be removed easily by heating the specimens for a short period in hydrogen. It thus appears that the stains observed in the works are not produced by the action of any of the above gases. An interesting fact is that a single gas favors, and a mixture of gases tends to inhibit, the volatilization of zinc.

**Effect of Sulphur Dioxide.**—A number of samples were annealed in an atmosphere of sulphur dioxide. A black scale, composed of mixed oxides and sulphides, was formed, which invariably gave rise to red staining upon pickling. A few more experiments were carried out in which samples were annealed in a muffle furnace into which fragments of sulphur were introduced from time to time. No staining was obtained in these cases, although the sulphur dioxide present must have been much greater than that present in the works annealing furnaces.

**Effect of Flames, Etc.**—A number of samples of metal were taken and annealed in various ways, as given below:

- (a) Beneath the surface of charcoal powder.
- (b) Beneath the surface of charcoal ash.
- (c) About  $\frac{1}{2}$  in. above the surface of charcoal powder contained in an open dish.
- (d) About  $\frac{1}{2}$  in. above the surface of charcoal powder in a closed tin.

Considerable staining occurred in a number of cases, both when the specimens were embedded in charcoal and when the specimens were suspended above the charcoal. It could not be definitely stated that no copper patches existed before pickling, but most of the stains were certainly produced by interaction of the copper oxides with the pickling acid. It was not clear from these experiments whether it was the actual con-

tact with the charcoal which caused the staining, or whether the action was due to gases which would circulate freely through the porous charcoal. Hence a fresh series was carried out as below, with graphite.

Strips of brass with various copper contents were partly embedded in graphite contained in an open fire-clay dish. The strips were bent, so that the covered part was horizontal and the uncovered part vertical. The specimens were then annealed for about 15 minutes at 700 deg. C. (1300 deg. Fahr.). The portions of the strips that had been covered with graphite were in all cases practically free from stains, while the uncovered vertical portions were stained typically at those portions upon which the carbon monoxide flame had been playing. Repetition of the experiments gave similar results. The graphite was analyzed and found to contain 18 per cent of ash and 1 per cent of moisture. The sulphur content was low, only 0.027 per cent.

It is thus certain that the staining caused by annealing in graphite could not be due to

- (a) Ash, because the covered parts of the sample were free from stain.
- (b) Sulphur, because of the very low sulphur content of the graphite.
- (c) Moisture, since that would all disappear at the commencement of the first heating. (The same graphite sample was repeatedly used.)

It has been shown that the gases carbon dioxide and carbon monoxide do not cause staining, so that the staining in these experiments was caused by the flames of the burning carbon monoxide.

Experiments similar to those made with graphite were carried out with a coal containing 59.5 per cent of coke, 4.5 per cent of ash, 10 per cent of moisture, and 1.2 per cent of sulphur.

Again there was much staining where the flame had impinged. There was staining also in some cases upon the covered portions, but this was due possibly to the influence of the sulphur present in the coal, as the part that had been covered did not pickle so easily as the uncovered part. As further confirmation, samples were annealed in the same muffle in the same dish, but in the absence of the graphite or coal. These samples did not stain. Other samples were annealed in the same muffle, but in this case coal was burning at the back of the muffle and giving off smoky flames. Again specimens stained when annealed in the path of the flames.

It appears that when hot flames or hot gases are allowed to impinge upon brass which is being annealed, the formation of copper oxide takes place and staining arises during the subsequent pickling. It should be emphasized that:

1. Perfectly clean brass can be stained in this way.
2. The presence of sulphur is not necessary.
3. The effects were obtained by the author in about ten minutes.

**Works Observations.**—In the works, much of the metal is annealed in coal-fired furnaces, in which the smoky flames pass over and impinge upon the metal. Large sheets of brass are usually superimposed during the annealing, while strips are frequently annealed in the form of loose coils. It is found that by far the greater part of the staining occurs along the edges of these sheets and rolls in the form of wavy lines, while the middle portions are usually practically free from the defect. The outer portion of a coil is usually stained over the entire exposed part.

In the case of sheets, the top sheet may be stained over a considerable area on its upper surface. The author has seen both the smoky yellow flames from the

\*University of Birmingham, England. This abstract of a paper presented before the Institute of Metals is concluded from page 439 of our issue of Feb. 7.

coal and the blue carbon monoxide flames playing around the metal and impinging upon these parts which are found to stain.

Many furnaces are in use in which the metal is completely protected from the flames and hot gases, and it is found that by far the greater part of the trouble with red staining is thereby overcome.

**Conclusions.**—1. Red stains may be caused through the impinging of flames upon the metal during annealing, and most of the stains observed in the works are produced in this way.

2. The presence of sulphur dioxide in quantity will cause staining, and so will the condensation of moisture on the hot metal but, for reasons given above, these are at the most only subsidiary causes.

#### Summary

As a general summary of the causes of stains, it may be stated that the mechanism consists of:

- (a) Temporary formation of a copper-rich layer on surface of the brass.
- (b) Oxidation of this layer before diffusion of zinc can take place.
- (c) Reaction between the copper oxides so formed and the pickle acid, with the deposition of a copper film on the sheet.

Examination of the factors causing staining shows them to consist of agencies which remove zinc rapidly either by chemical attack (including oxidation) or by volatilization.

There is also the effect of what is best described, in view of the lack of knowledge as to its chemical and physical significance, as "sheer dirt." This latter is a factor which generally assists all the main causes of staining, although its own special effect is probably less important and cannot be isolated.

It is not claimed that the matter has been entirely cleared up, but a wide field has been covered, and sufficient has been done to show the great complexity of the subject of red staining.

#### Conclusions

**General Conclusions.**—The main cause of the red staining observed in the works is the impinging of hot flames and gases onto the metal during the annealing. The chief subsidiary causes are:

- (a) The influence of salt and acid left by imperfect washing of the sheets after pickling.
- (b) The use of impure rolling oils.
- (c) The presence of iron in some form during the annealing or pickling.
- (d) The presence of much sulphur dioxide in the furnace gases.
- (e) The deposition of water onto the red hot metal. Staining becomes more severe as the copper content of the brass is increased.

#### Minor Conclusions

1. Alloys of copper other than brass and containing no volatile constituent can be caused to red stain.
2. Red stains can be caused to disappear by means of a short annealing at 600 deg. C. (1112 deg. Fahr.) under strictly non-oxidizing conditions.
3. Cupric oxide, in the absence of a metallic sample, dissolves in dilute sulphuric acid, but in the presence of an alloy containing copper a film of copper is deposited on the metal.
4. When brass is annealed in air there is no relation between the temperature and time of annealing and the quantity of copper oxide in the scale.
5. Red staining may be removed from brass by use of a pickling solution containing a salt of a "per-acid."

#### Prevention and Removal of Red Staining

Since the causes of staining are so diverse, it is obvious that the prevention of staining is going to be difficult. The use of closed annealing furnaces will obviate many of the causes of staining, and fairly good results are obtained by the use of closed furnaces. Many of these furnaces are improved by the provision of water seals to the charging doors. The greatest

point urged against these furnaces is the fuel cost, which is much greater than in open or "inflamm" furnaces. It should be pointed out, however, that it may be cheaper to burn coal than good brass. Many of the smaller strips in the works are annealed in closed pots, and here little staining occurs. Since most of the stain occurs through reactions in the pickling tank, it seems possible that the trouble may be overcome eventually by the abolition of the pickling operation and the removal of the scale by scouring or by sand-blasting.

As regards the staining caused by oils and greases, it has been suggested that the grease should be removed by caustic soda solution before the annealing, but unless the caustic soda is thoroughly removed it will be more harmful than the grease.

A pickling solution containing dichromate is used with excellent results in some works. The most economical method appears to be the removal of all scale in the ordinary pickling solutions, and then the removal of stains as a final operation.

The only alternative appears to be a final annealing of short duration at 600 to 650 deg. C. (1112 to 1200 deg. Fahr.) in an inert gas, preferably hydrogen. This could be used only for small work, probably.

#### Slide Rule Settings for Weights of Bar Stock

BY HENRY SIMON

In the diagram and table are slide rule settings for the weight of round, hexagon and square stock of iron, steel and brass. This has the advantage of being carried out in a consistent and easily remembered manner. It will be noted that in every case the figure set on B scale is 0.3 for weight per foot and 3.6 for weight per inch. As most tables give sizes only by sixteenths and thirty-seconds, and the weights even then only per foot, the settings below will be found useful.

If it is remembered that the algebraic equivalent of the settings is in all cases, for instance

$$X = \frac{0.786 \times (\text{diam.})^2}{0.3}$$

it will be easy to figure the decimal point for the result. The quotient of A to B in each case has one whole number for weight per foot, but is a decimal fraction for weight per inch. It will also be noticed that the remaining figures are easily remembered.

The above settings give results correct to three significant figures in all cases.

Slide Rule Setting for Weights of Bar Stock

		Scale			
Iron	A	0.786	0.86	1.0	
	B*	0.3	0.3	0.3	
Steel	A	0.8	0.88	1.02	
	B*	0.3	0.3	0.3	
Brass	A	0.87	0.96	1.11	
	B*	0.3	0.3	0.3	

\*For weight per foot: use 3.6 for weight per inch. In all cases read results on scale A over diameter on scale C.

Leather belting exported in the calendar year 1923 from the United States is reported by the Department of Commerce at 1,064,449 lb., valued at \$1,689,622, or an average of \$1.59 per lb. This compares with 1922 figures of 1,092,308 lb., valued at \$1,638,496, or an average of \$1.50 per lb.

The Sharon Steel Hoop Co. in January produced 33,000 tons of ingots in its six 70-ton open hearth furnaces, Lowellville, Ohio, thereby breaking all previous production records in that department. The January production was at the annual rate of about 400,000 tons.



# Foreign Trade in Iron and Steel for 1923

Producing More Steel Than All the Rest of the World Combined, the United States Ranks Fourth in 1923 in Export Trade

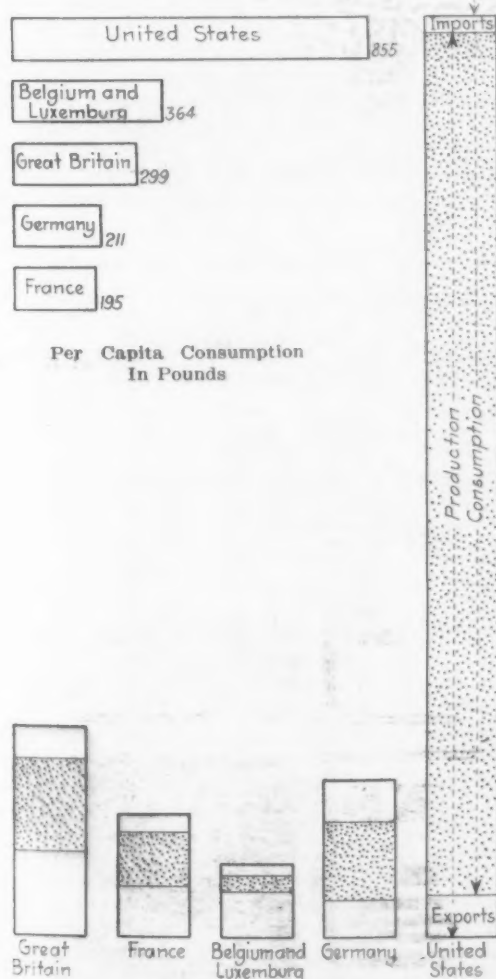
IRON and steel products exported from the United States in 1923 amounted to about 2,000,000 tons; a gratifying tonnage, perhaps, but not fully satisfactory. While the figure is a small increase over 1922, it is under that of 1921 and represents approximately two-thirds of the outgoing iron and steel in the pre-war year of 1913. The year's pig iron production was 40,000,000 tons and the steel ingot output around 43,250,000 tons. With an export figure of 2,000,000 tons, its ratio to pig iron production was 5 per cent and to steel  $4\frac{1}{2}$  per cent.

Imports were over 500,000 tons during the first half of the year and, though there has been a steady decline since June, it is safe to estimate the year's total at about 760,000 tons. This is an increase of between 10 and 15 per cent over the imports for 1922 and is more than twice the figure for 1913. Increased deliveries of foreign pig iron and scrap, particularly in the first half of the year, account for this rise.

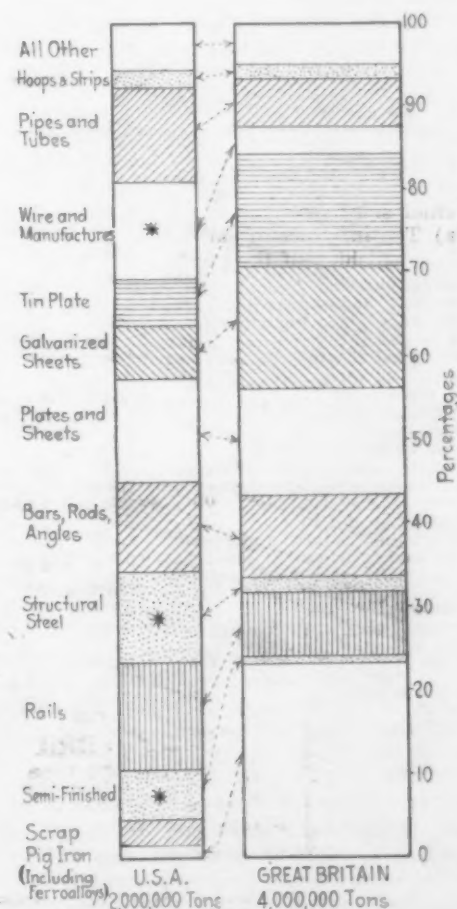
However, the results for the year may be said to be satisfactory when we consider the increasing demand at home for maintenance and new construction; the growing use of iron and steel in the United States as a substitute for other materials less abundant or more costly; the uncertain political and economic conditions in many of the world's markets, causing lack of stability in many foreign exchanges and a necessity overseas to restrict buying to a minimum, and the addition, all over the world, of producing units which, however small, reduce the possible market for semi-finished and finished products turned out by the former primary and secondary world units.

Table I is a comparison between pig iron and steel ingot production and exports and imports of iron and steel products for the years 1913, 1921, 1922 and (estimated) 1923. Following the tonnage figures are index numbers for which each total for the year 1913 is used as a basic index of 100.

Study of Table I shows that, though pig iron production in 1923 was 29 per cent more than in 1913 and that of steel ingots up 43 per cent, exports will be 28 per cent smaller and imports more than twice as great. Forgetting causes, the fact remains that we have lost



Production, Exports and Imports of Steel Products by Five Leading Countries. The lower white area represents exports, Germany alone having a smaller volume than the United States. The dotted area shows the consumption of the domestic product, to which must be added the imports, in determining the total consumption. The tremendous absorptive power of the United States is shown vividly by the diagram at upper left



Distribution of American and British Exports of Iron and Steel Products. The heights represent percentages of the total, as shown by scale at right. The areas are proportional to tonnage shipped. In only three items, designated by \*, did the United States in 1923 ship a larger tonnage than did Great Britain

ground. The natural question which arises is: Could we have done better?

Experience shows that it is often just as valuable to know that there is not a market for our products, in

of products or countries where distributed. But it makes up a formidable tonnage and will give France second place for foreign iron and steel deliveries.

#### Germany

From available statistics covering the foreign trade of Germany for the first eight months of 1923, imports of iron and steel products exceed exports by about 100,000 tons. Of the outgoing total, reported as approximately 1,200,000 tons, 260,000 tons is accounted for under scrap. This is abnormal. But everything is abnormal in Germany, no guarantee is given for data from the Ruhr, and it is difficult to review the German figures in a comparative way.

For the eight months in 1922 imports of scrap amounted to 375,000 tons and exports to 27,000 tons, compared with 143,000 and 260,000 tons, respectively, for 1923. Iron and steel bars, including hoops and bands, form the most important export item in 1923, with plates and sheets in second place. The outgoing rails and accessories for 1923 amounted to approximately one-fourth of the quantity reported in the eight-month period of 1922. Any attempt to estimate German production would be a pure guess.

#### Belgium and Luxemburg

While Belgium and Luxemburg, considered from a capacity and producing standpoint, do not rank with the major units, the amounts of iron and steel exported from the mills of the economic union of Belgium and Luxemburg certainly place the union in the first rank as regards foreign trade. Their total outgoing tonnage for the first eight months of 1923 is reported as being more than 1,500,000 tons, and there is every reason to believe that the year's total was not less than 2,200,000 tons. Based on the reported production for the first eight months, the year's output of pig iron was about 3,200,000 tons and that of steel 3,000,000 tons. The total imports of both countries were approximately 500,000 tons. Semi-finished steel, rails, bars and structural shapes formed the most important export items,

Table I.—United States Iron and Steel Production, Exports and Imports Compared

Year	(Gross Tons)			
	Pig Iron Production	Steel Ingots Production	Iron and Steel Exports	Imports
1913.....	30,966,000	30,280,000	2,760,000	316,000
1921.....	16,688,000	19,224,000	2,202,000	124,000
1922.....	27,220,000	34,568,000	1,915,000	675,000
1923.....	*40,000,000	*43,250,000	*2,000,000	*760,000

Index numbers, base year 1913.

Year	Pig Iron	Steel Ingots	Iron and Steel Exports	Imports
1913.....	100	100	100	100
1921.....	54	64	80	39
1922.....	88	114	69	214
1923.....	129	143	72	245

\*Estimated.

a given place, either at home or overseas, as to find that there is.

#### France

In the first nine months of 1923 France exported more than 1,900,000 tons of iron and steel. As her mills have been producing proportionally more during that part of the second half for which figures have been published than during the first half, it is estimated that her total foreign shipments for the year will exceed 2,400,000 tons.

French pig iron production for the first ten months was approximately 4,155,000 tons and that of steel 3,870,000 tons. With total production for the year about 5,000,000 tons for each, France's export ratio to iron or steel production was nearly 50 per cent.

Analyzing the reported export figures for the first nine months, 443,000 tons are pig iron, 595,000 tons semi-finished steel, 412,000 tons scrap, 166,000 tons

Table II.—Exports of Iron and Steel, United States and United Kingdom—1923

Quarters	United States				United Kingdom			
	First	Second	Third	*Year	First	Second	Third	*Year
Pig iron and ferroalloys.....	9,515	9,037	8,448	35,000	272,477	260,673	183,101	925,000
Ingots, blooms, billets, slabs, skelp, etc. ....	29,714	33,724	24,530	120,000	6,538	16,751	5,885	35,000
Iron bars, rods and angles....	6,941	3,156	2,117	14,000	9,308	10,914	10,185	40,000
Steel bars, rods, angles, etc....	46,090	55,040	47,579	200,000	78,558	93,794	82,979	340,000
Plates and sheets.....	55,990	74,215	51,168	245,000	100,366	150,921	123,396	510,000
Galvanized sheets.....	30,352	37,145	24,057	130,000	154,741	151,028	126,370	580,000
Hoops and strips.....	9,003	11,693	9,163	40,000	17,211	18,215	16,203	70,000
Tin plate.....	18,529	33,686	27,228	110,000	136,517	145,355	120,516	540,000
Structural steel.....	46,845	55,021	59,812	215,000	16,984	18,754	18,361	70,000
Rails.....	50,490	67,341	79,991	260,000	57,893	85,625	81,034	305,000
Other railroad material.....	11,158	15,643	18,629	65,000	33,558	55,193	43,533	180,000
Wrought tubes, pipes and fittings	38,122	49,391	49,489	185,000	38,711	38,232	26,609	140,000
Cast tubes, pipes and fittings...	8,076	8,530	10,979	40,000	23,571	20,375	22,790	90,000
Wire.....	34,154	57,885	36,347	170,000	19,405	22,428	17,844	80,000
Wire cable and rope.....	2,079	2,571	1,930	8,000	5,435	5,979	6,320	24,000
Wire nails, including staples...	6,313	12,777	10,089	40,000	962	1,235	640	3,200
Wire manuf. n.e.s. ....	3,910	4,066	4,677	17,000	5,804	5,844	5,975	23,000
Nails, tacks, rivets and washers	2,074	2,664	2,012	8,000	3,549	5,375	4,109	19,000
Bolts and nuts, including screws for metals.....	4,172	5,160	4,902	18,000	5,184	6,056	6,084	23,000
Iron and steel castings.....	3,270	4,167	4,097	16,000	962	754	444	2,600
Iron and steel forgings.....	877	1,230	1,047	4,000	229	376	324	1,200
Scrap.....	8,476	12,752	27,986	60,000	.....	.....	.....	.....
Total.....	425,250	556,894	506,277	2,000,000	987,963	1,113,877	912,702	4,000,000

\*Fourth quarter estimated.

rails, and 107,000 tons structural steel. These five items amount to more than 90 per cent of the total. Pig iron and semi-finished account for 54 per cent, scrap for 22, and rails and structural steel combined, 15 per cent. Of the million tons of pig and semi-finished, about 475,000 tons went to Belgium and Luxemburg, 135,000 tons to Switzerland, 125,000 tons to Great Britain, 95,000 tons to the Saar territory, 55,000 tons to Italy and about 16,000 tons each to Germany and the United States. Thus the spread of the French iron and steel foreign trade is not very broad, either in numbers

and the United Kingdom was the largest single customer. It is thus apparent that, in combination, these two countries will rank second or third in quantity of foreign trade and that their export ratio (approximately 70 per cent to either pig iron or steel) was higher than that of France, Germany, United Kingdom or the United States.

#### United States vs. Great Britain

From statistical figures available at this writing, the two accompanying tables have been prepared. One shows



the tonnages of principal iron and steel products exported by the United States and the United Kingdom, by products, for the first three quarters of 1923 and with an estimated total for the year. The other shows the distribution in the principal markets of the world of these products for the first three quarters.

In round numbers, 7,400,000 tons of pig iron and 8,500,000 tons of steel ingots were produced in 1923 by the United Kingdom. Against this is an estimated export tonnage of 4,000,000, or a ratio of something like 50 per cent with either iron or steel. Even if 2,000,000 tons is set aside as going to British dominions, colonies and possessions, there is still left an equal tonnage which approximates the total export performance of the United States.

If the figures in Table II, of exports by products, are

the British tables under unclassified products, which will come to about 200,000 tons of miscellaneous iron and steel products for the year, are purposely omitted from the comparative table. This accounts for the fact that the totals under the United Kingdom in the two tables do not check.

Offsetting this is an item of more than 100,000 tons in the American figures, made up of 25,000 tons of builders', marine and furniture hardware, 65,000 tons of miscellaneous items not classified, and over \$30,000,000 worth of cutlery, furniture, tools, stoves, furnaces, radiation, etc. No part of this tonnage appears in Table III as a credit to the United States.

Distribution of exported products by countries, shown in Table III, furnishes interesting comparative data. Figures for only the first three quarters are

Table III.—Distribution of the Exports of United States and Great Britain, 1923  
(Gross Tons)

Countries of Destination	From United Kingdom			From United States		
	First Quarter	Second Quarter	Third Quarter	First Quarter	Second Quarter	Third Quarter
United Kingdom .....	.....	.....	.....	15,711	17,234	15,586
United States .....	143,659	88,359	53,349	.....	.....	.....
Canada .....	18,634	34,021	25,264	184,301	221,803	206,568
Belgium .....	36,326	43,686	27,719	1,846	2,561	1,358
Denmark .....	13,734	14,831	9,382	350	292	538
France .....	30,534	43,439	20,828	2,557	2,859	995
Germany .....	40,507	86,816	98,134	212	677	477
Italy .....	26,686	24,345	16,327	622	1,784	491
Netherlands .....	20,651	19,303	15,424	1,038	1,282	1,853
Norway .....	9,900	12,261	7,328	678	1,290	1,411
Portugal .....	5,205	10,438	10,175	123	54	56
Spain .....	8,891	9,773	9,154	2,711	1,875	1,905
Sweden .....	7,366	10,491	14,188	253	210	1,163
Switzerland .....	1,071	3,745	3,165	233	450	572
Australia .....	130,395	121,647	102,423	12,880	8,476	9,328
China .....	11,403	12,020	14,430	9,367	13,421	9,112
Hongkong .....	4,550	3,863	3,015	3,198	3,975	1,564
India and Ceylon .....	177,976	153,041	124,026	9,196	1,753	7,197
Japan .....	46,683	81,628	49,743	50,088	91,648	58,261
Kwantung .....	.....	.....	.....	1,281	10,785	5,123
New Zealand .....	32,007	23,701	23,535	1,399	1,170	691
Philippine Islands .....	.....	.....	.....	6,815	7,935	9,957
Straits Settlements .....	10,333	10,246	6,728	1,775	443	487
British East and West Africa...	7,989	24,966	15,997	444	40	108
British South Africa .....	36,022	40,316	42,702	2,280	5,165	3,286
Egypt and Palestine .....	9,181	22,126	18,075	330	277	244
Portuguese East Africa .....	5,182	5,004	1,807	223	853	231
British West Indies .....	671	475	1,711	1,938	3,208	2,773
Argentina .....	39,926	42,975	34,390	12,209	18,472	12,412
Brazil .....	8,955	6,243	9,283	9,552	10,439	13,379
Chile .....	4,475	6,584	6,206	8,346	8,273	12,830
Colombia .....	.....	.....	.....	8,471	6,585	6,007
Cuba .....	.....	.....	.....	27,302	52,855	61,218
Dominican Republic .....	.....	.....	.....	1,455	2,812	4,158
Guatemala .....	.....	.....	.....	1,187	1,762	1,551
Honduras .....	.....	.....	.....	6,990	2,263	3,128
Mexico .....	.....	.....	.....	18,949	23,268	21,338
Panama .....	.....	.....	.....	1,522	2,467	2,411
Peru .....	.....	.....	.....	6,141	6,538	8,466
Uruguay .....	.....	.....	.....	1,704	2,396	3,187
Venezuela .....	.....	.....	.....	2,412	2,628	4,608
Other South American countries	6,838	8,793	4,177	2,718	4,836	5,624
All other countries and non-allocated .....	143,189	211,478	195,136	4,444	7,280	4,725
Total .....	1,039,029	1,176,614	965,532	425,250	556,894	506,277

\*Included in "All other countries and non-allocated."

subjected to further grouping under major classifications, it will be seen that the American mills lead the British in foreign shipments of semi-finished products (skelp being included), wire and wire products, structural steel, tubular products and, considering the ratio, rails. In the case of pig iron we are entirely out of the running, for obvious reasons. In the case of sheets and plates and tin plate, the British figure totals more than three times that of the American. However, there enters into this particular comparison the great domestic demand for sheets in the United States and the large tonnage that eventually is exported in another form: for example, as parts of outgoing automobiles and trucks.

#### Not Strictly Comparable

It should be noted that some items in Table II are not exactly comparable. For example, the American semi-finished item "ingots, blooms, etc.," includes a large tonnage of skelp, and the items under iron bars and steel bars include, in the British figures, some tonnage of angles and sections in bar sizes not included in those for American. The amounts usually reported in

given. During the nine months reviewed, Canada alone took 41 per cent of the total American exports, and the two other nearby markets, Cuba and Mexico, took 10 and 4 per cent, respectively. Japan (including Kwantung), our only far-away market to register a fairly large tonnage, took approximately 14 per cent. This accounts for nearly 70 per cent of our total.

Not so the spread of British exports. Eliminating the distribution to the countries which form the British Empire, where products from the United Kingdom receive advantages over those coming from America, the take-up is more evenly divided and in most cases the tonnage is greater. Thus Argentina, in the South American group, took 117,000 tons from the United Kingdom and only 43,000 tons from the United States. But Brazil, in the same group, bought 24,000 tons from Britain and 33,000 tons in the same nine months from the United States. and to Chile Britain sent 17,000 tons against our 29,000.

A detailed review, country by country, leads to the conclusion that, if American manufacturers wish to increase and hold their export market, there will have to be more concentrated effort in at least some of the

most strategic points. The performance this year seems to show that what was exported from the United States was by way of a "seller's market." That method

has many advantages, but it lacks a very essential feature in that it holds no permanent and sure prospect for the future.

## Steel and the Petroleum Industry

### Handling Tool Steel in the Drilling Field—Desirability of Closer Control Over Quality

BY FRANCIS B. FOLEY\*

SOME tools, notably bits, require forging and heat treating in the field. Where this kind of work has to be done in temporary shops by free lance workmen the conditions border on the impossible. Few facilities available in the permanent plant can be economically installed in these temporary shops. The furnaces particularly are quite crude. A fortunate condition exists where the larger producers have big holdings and have installed permanent central shops, where bits are forged and tempered under the supervision usually of careful, skillful foremen.

Bits used in oil-well drilling are large and the very large cable tool bits have considerable mass. Even in a well-equipped shop, such masses of steel would get great care from skilled working in heating and forging. The heat is under good control and that is essential. There is great danger, in heating large masses, of quickly attaining a high temperature on the surface of the metal while the center of the mass is at a considerably lower temperature. This often causes the metal to crack and gives a poor forging job.

#### Decarburizing the Surface

Another great danger comes from decarburizing the surface of the steel. This is caused by using an excess of air with the fuel; the excess air combining with the carbon in the steel and removing it as a gas, leaving behind carbonless iron over the surface of the metal, which it is impossible to harden in subsequently treating the bit. This decarburization goes on much more rapidly at high temperatures and is almost inevitably present in steel which has been subjected to too high a temperature, either for forging or hardening.

Some degree of decarburization is almost certain in the types of furnaces used by the field tool dressers. If there is total decarburization of the surface metal, so that nothing remains but a skin of practically pure iron, the steel will not harden at all. If the decarburization has not been so severe, so that there is only a reduction in the amount of carbon in the surface metal, then it may be possible to harden the metal, but the quench must be from a higher temperature than that which would suffice under normal conditions. Probably it is this which accounts for the great tendency to use high temperatures for hardening, a practice which is to be deplored because, while the temperature used might not adversely affect the skin of the steel, it is often too high for the metal beneath, which is of higher carbon. Quenching from too high a temperature produces a brittle steel.

#### Using a Lead Bath

A lead bath has been used with considerable success in hardening 6-in. cable tool bits. The temperature of the lead can be closely regulated by using a pyrometer. The tool is suspended from a cantilever arm over the pot, with just the proper amount, say 2 in., of the bit immersed in the lead. The arm carrying the tool then can be swung so as to carry the tool over a bath of agitated water, in which the tool is quenched. If the bit is quenched dead cold it will be too brittle, so that chipping results. To prevent this, the time of immersion in the water can be 20 to 30 sec., so that the bit

comes out warm enough and the heat in the portion which has not been in the water runs down into the tip and draws the temper at the edge.

Another method of preventing the chipping, which is equally successful but which requires more apparatus and time, is that of reheating the bit immediately, after quenching it practically cold. For this purpose an oil bath is used. It is necessary, in using a lead bath, to keep the surface of the lead covered with a layer of carbon, otherwise the lead oxide formed on the surface of the bath will attack the steel at the point where it makes contact.

Fish tail bits do not present the difficulties of very great mass that the standard tools do, but the same precautions regarding decarburization and overheating are to be observed. Because the section is not so great, the bit heats more rapidly and there should be less tendency to force the heating, although the relatively thin edge is apt to become too hot. On the whole, one hears less complaint about the performance of fish tail bits, perhaps because the drilling is usually much easier.

#### Good Performance for a Drill Bit

What is good performance for a drill bit, standard or rotary, is a question that is answered only by a guess. It is almost impossible to obtain quantitative figures from which a performance figure can be derived.

Probably the trouble of greatest concern to rotary drillers comes from twist-offs of drill pipe. In this the pipe manufacturer is pushed to the limit to keep up with a strong tendency in many places to speed up the tables. However, the same thing is evident in other engineering fields. The airplanes and high-speed cars of today would not have been possible had not the developments in metallography kept pace with the demands of high-speed engines. Of course there is a limit, a safety limit, that cannot be exceeded.

It is an easy matter to go about the oil fields and find broken steel parts but it is another matter to find out how serious is the loss of time involved by the failures. There is no doubt that many of the parts which fail frequently can be greatly strengthened, but the strengthening often involves greater costs and the increased costs have to be justified by a commensurate saving. To know what the probable saving would be it would be necessary to know how much is lost through failures of the material now being used.

Figures showing how much time is lost by twist-off of drill pipe, by broken cable, by broken roller chain, by frequent changing of bits, apparently are not available. They can be procured by a close time study on a large number of wells. Of course, drilling crews generally would not welcome such a study. But conceivably some crews can be found willing to cooperate and, once the advantage of such a system of checking up on the weak spots in the drilling equipment was established, it would probably become general. Certainly it is necessary, in making an improvement which is to involve an expenditure, to have a basis on which to estimate the probable saving.

#### Corrosion

In giving our attention to the metallographic side of the oil industry, sight should not be lost of the prob-

\*Metallurgist, United States Bureau of Mines. This is an abstract of a paper presented at St. Louis at the fourth annual meeting of the American Petroleum Institute.



tem of corrosion. This problem is quite serious in fields located near the sea coast, if considerable quantities of equipment are held in stock for long periods of time. It is also a problem in refinery equipment, in absorption plants and in underground pipe and casing. We find the statement made by no less an authority than Sir Robert Hadfield that, during 1921, the amount of steel and iron ruined by corrosion was almost as great as the pig iron produced, though most of the metal was recoverable as scrap. It is difficult to see how figures of this kind can be obtained but the statement, whether quantitatively accurate or not, shows what a great problem the question of corrosion is.

The mechanism of corrosion is a baffling study, a metal being easily attacked by one reagent and highly resistant to another. However, a detailed investigation

of each individual problem, the petroleum engineer and the steel man working together, should lead to a solution.

#### Iron and Steel Problems

Summing up, the petroleum industry has the following iron and steel problems before it:

1. Closer control over the kind and quality of steel entering into the equipment.
2. Improvement in the dressing and hardening of bits in the field, with particular reference to the free lance field smith and to shop equipment.
3. Determination of the loss of time and the cost involved by breakage of various parts and by frequent bit changing caused by wear.
4. The study of corrosion with particular reference to oil field and refining operations.

## WOULD SET ASIDE SALE

### Some Cambria Steel Co. Minority Stockholders Seek to Set Aside Sale to Bethlehem Steel Corporation

Minority stockholders of the Cambria Steel Co., Johnstown, Pa., now a part of the Bethlehem Steel Corporation, have filed a suit in equity in the United States District Court for the Southern District of New York alleging a "fraudulent conspiracy" in the transfer of the Cambria Steel Co. to Bethlehem, and petitioning the court to declare the sale illegal and void. The appointment of a receiver for the Cambria company is asked for pending the final decision in the case.

The complainants are Edward B. Graves, St. Paul, Minn.; Walter G. Graves, Cleveland; Arthur C. Graves, New Haven, Conn.; Mary C. Graves, Bridgeport, Conn.; A. Marjory Graves, executrix of the estate of the late Richard S. Graves, New Haven, Conn., and William A. Paine, Boston. Those named as defendants are the Cambria Steel Co., Midvale Steel & Ordnance Co., Bethlehem Steel Co., Bethlehem Steel Corporation, Bethlehem Steel Products Co., Guaranty Trust Co. and the same company as trustee under an indenture securing bonds of the Midvale Steel & Ordnance Co.; also Alfred A. Corey, Jr., Alva C. Dinkey, William E. Corey, John C. Neale, Samuel M. Vauclain, William B. Dickson, Powell Stackhouse and J. Carson Agnew.

Graves, Miles & Yawger, 111 Broadway, New York, solicitors for the complainants, in their bill of complaint, say that the minority stockholders have requested information regarding the value of Cambria's assets, but have been refused such information. It is claimed that the Cambria Steel Co. had earned an amount greatly in excess of its published earnings and that its assets had been intentionally undervalued. It is expressed as the belief of the minority stockholders that the actual value of the Cambria property was \$360,000,000 and that its stock was worth \$400 a share.

The recent sale of the Midvale Steel & Ordnance Co., the complaint alleges, was due to the efforts of the Guaranty Trust Co. to obtain better security for \$50,000,000 in bonds by a direct mortgage lien on all of the properties of the Cambria Steel Co. The Midvale company, it is stated, was obligated to the Guaranty Trust Co. and to other creditors for a sum totaling \$53,525,000 and had no surplus or reserves.

The officers of the Midvale Steel & Ordnance Co., the Bethlehem Steel Corporation and the Guaranty Trust Co. agreed among themselves, it is alleged, to convey all of the properties of the Cambria Steel Co. to the Bethlehem company below their real value. This agreement was made easy, it is stated, through the close financial association of the men interested in these companies. Charles H. Sabin, chairman of the board of directors of the Guaranty Trust Co., was a member of the board of directors of the Midvale company, while Eugene G. Grace, president Bethlehem Steel Corporation, was a director of the Guaranty Trust Co.

It is claimed that no real consideration was involved in the sale of the Cambria properties beyond the assumption by Bethlehem of Midvale's obligations and the exchange of stock of Bethlehem for that of Midvale, which the complainants aver was not an equitable exchange. The Cambria minority stockholders claim that certain individuals connected with the sale were rewarded by the Bethlehem Steel Corporation by election to the board of directors or were given other remunerative positions.

The consideration offered and paid by the Bethlehem Steel Corporation for the Cambria properties, it is claimed, did not exceed 17 per cent of their true worth.

The Cambria minority stockholders ask the court to set aside the sale on the ground that there was no cash consideration, that the acquisition of the Cambria steel plant by a competitor tends to create a monopoly and that the transfer has been financially damaging to them (the minority stockholders).

#### Statement of Bethlehem Counsel

The Bethlehem Steel Corporation, in a statement given out at its offices, said that its counsel had examined the complaint of the minority stockholders and had found that the suit is "without merit." The statement further says:

"All except a very small part of the stockholders of the Cambria Steel Co. approved the sale of its properties to Bethlehem and voted in favor of it. The sale was closed last March. We are advised that the liquidation of the Cambria affairs following its dissolution has been nearly completed, the holders of all except about two one-thousandths of its stock having surrendered their shares and received their part of the purchase price.

"It should be noted that only 125 shares of the total par value of \$6,250 are held by the six plaintiffs in the suit."

The experiment station building which was provided for by the Missouri State legislature in 1920 to house the Mississippi Valley experiment station of the United States Bureau of Mines and the Missouri State mining experiment station, has been completed. The building stands on the campus of the Missouri School of Mines and Metallurgy, Rolla, Mo. This station has for its particular field investigations concerning the mining, milling and metallurgy of zinc and lead. Some of the iron and steel investigations of the bureau also are being carried on at the station; these concern chiefly mine drill steel and oil well drilling equipment.

J. E. Moss Iron Works, Wheeling, W. Va., has purchased the Riverside Bridge Co., Martins Ferry, Ohio, approval of that company's stockholders having been given at a meeting Jan. 31. The Riverside company fabricated steel for use in building construction, and during the war fabricated steel for Shipping Board vessels. The capital of the Moss company will be increased to \$1,500,000 to take over the Riverside plant.

### Industrial Movies to Be Preserved for 5000 Years

Will present-day manufacturing methods seem to the people who inhabit this earth 5000 years from now as crude as the methods of the ancients now appear to us? This question was suggested in connection with an interesting project conceived by Watterson R. Rothacker of the Rothacker Film Mfg. Co., Chicago, in taking motion pictures of activities in various industrial plants for preservation in the Smithsonian Institution at Washington.

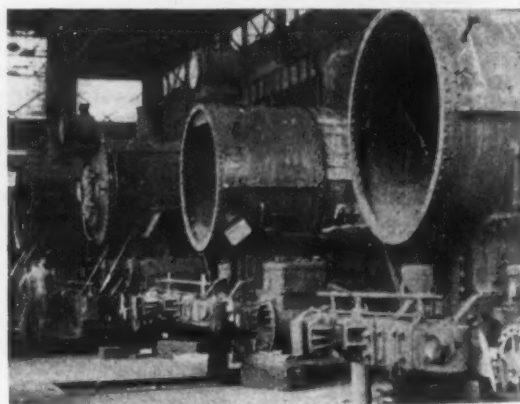
Until recently it was seriously doubted whether motion picture films could be preserved for future generations. The oldest piece of film in the world was still

### Youngstown Sheet & Tube Co. Disposing of Three Sheet Plants

YOUNGSTOWN, Feb. 11.—Recent sales of the Empire works, the old Brier Hill unit at Niles, Ohio, by the Youngstown Sheet & Tube Co. to Jacob D. Waddell and of the Thomas works, also at Niles, Ohio, to W. A. Thomas and Charles S. Thomas, make it apparent that it is the intention of the Youngstown Sheet & Tube Co. to rid itself of the sheet mill plants acquired by its absorption of the Brier Hill Steel Co. late in 1922. There is also official admission that negotiations are in progress for the sale of the Western Reserve works, Warren, Ohio, the other Brier Hill sheet plant. The Trumbull Steel Co. is mentioned as the probable buyer



Examples of Motion Picture Films of Today's Industrial Methods to be Supplied for Indefinite Preservation by the Smithsonian Institution at Washington



so young that no estimate could be formed of its probable life. It was regarded necessary first to work out a process which would have the effect of aging films hundreds of years, and then to work out another process for rejuvenating or preserving the film.

The preserving process has been perfected to the point where Mr. Rothacker is ready to deposit history's first collection of motion pictures sealed in a vault under conditions likely to insure their indefinite preservation. Mr. Rothacker will stipulate that the vault shall not be unsealed for at least 5000 years.

Scenes from a number of metal trades and machinery movies will be included in the collection. These scenes will be taken from various pictures which the Rothacker Film Mfg. Co. has made in the plants of the American Rolling Mills Co., Commonwealth Steel Co., Mid-West Engine Co. and Sullivan Machinery Co. The scenes have been selected with a view to giving people centuries hence a comprehensive idea of industrial methods of today.

A. H. Nilson, president Nilson Machine Co., Bridgeport, maker of special and automatic machinery, reports a full shop and prospects for a full year's activity.

of this plant, which lies close to the open-hearth department of the Trumbull company.

Sale of these plants, which contain 26 sheet and two jobbing mills, with a combined annual capacity of 170,000 tons, will reduce the sheet capacity of the Youngstown Sheet & Tube Co. to 15 mills with an annual capacity of 88,000 tons.

The three plants which are being disposed of are operated as union mills, the Brier Hill Steel Co., the former owner, having signed the wage scale settlement agreement with the Amalgamated Association of Iron, Steel and Tin Workers, and while the Youngstown Sheet & Tube Co. continued this arrangement upon taking over the plants, it has continued its own sheet mills on an open shop basis.

Aluminum wire is dutiable at 25 per cent under paragraph 316 of the Fordney-McCumber tariff act, Assistant Secretary of the Treasury Moss has advised the collector of customs at Ogdensburg, N. Y. He gave instruction to assess this duty after being informed that the Deputy Collector at Rouses Point, N. Y., had been assessing a duty of 9c. per lb. under paragraph 374 covering aluminum in coils, plates, sheets, etc.



## TO INSURE QUALITY

### Sheet Manufacturers Will Cooperate with the Department of Commerce

Discussion of plans for the improvement and standardization of galvanized sheets was the feature of the last meeting of members of the National Association of Sheet and Tin Plate Manufacturers, held in Chicago, Feb. 5. The practice of some jobbers and supply houses selling a lighter material than buyers supposed they were getting, it was brought out, was doing the galvanized sheet industry an injury that might become irreparable unless steps were taken immediately to correct the situation. To that end, the manufacturers have pledged themselves to a program that will result in the consumer getting what he pays for, through the establishing of standard weights for the various gages and the use of a brand to denote gage and weight. In this connection, the association members have pledged themselves to full cooperation with the Department of Commerce in its efforts along standardization and simplification lines and a meeting to consider the whole subject is to be held in Washington at an early date.

As is well known, jobbers and dealers in galvanized sheets buy them from the mills on a pound basis and sell them at a price per square; this practice has allowed the small distributor a fair profit, but in recent years there has crept into the business more or less deception as to gages and weights. Distributors in ordering, say No. 28-gage material have usually requested that it be rolled light. When sold on a foot or square basis, this often resulted in an extra profit for the seller, but it also spelled failures for the material, since the buyer usually obtained sheets of a quality and weight not suited for the intended service. With the setting up of standards, expected to result from the Washington meeting, it is no longer going to be possible for the small distributor to purchase other than what the standard specifies as to weight and quality and through the use of the brand, it is hoped to prevent the deception of the buyer.

### Professional Societies Favor Mellon Tax Plan

At a meeting in the Engineering Societies Building, New York, on Feb. 1, resolutions were passed endorsing in principle the Mellon plan for the reduction of taxes. The following societies had representatives at the meeting:

Actors Equity Association, Authors League, American Pharmaceutical Society, American Medical Association, American Society of Composers, Authors and Publishers, American Chemical Society, American Institute of Mining and Metallurgical Engineers, American Society of Civil Engineers, American Society of Mechanical Engineers.

### Annual Meeting of Associated Employers of Indianapolis

INDIANAPOLIS, Feb. 11.—"The Law of Supply and Demand—Economics of Industrial Relations" was the subject of an address by Dr. G. W. Dyer, professor of economics at Vanderbilt University, Nashville, Tenn., given at the annual meeting of the Associated Employers of Indianapolis Feb. 8. Dr. Dyer stressed the importance of industrial freedom, that labor should be kept on a competitive basis for the best interests of both the employee and the employer rather than on a closed shop basis. It is a fallacy, he said, for the employer to think that he pays wages. Wages are paid by the consumer and it is the law of supply and demand that fixes the price of any product. Jacob H. Rubin of Milwaukee, Wis., told of some of his experiences in Russia and said that America should not recognize Soviet Russia because of the danger of the spread of Bolshevism. Russian communism is more of a religion

or fanaticism rather than a political structure, he said.

Directors elected at the meeting were: Samuel O. Dungan, E. J. O'Reilly, Henry L. Dithmer, Fred C. Gardner, Alfred Kauffman, A. L. Taggart, A. G. Rudell and Blaine H. Miller. The board will meet and elect new officers in a few days. Plans were announced in the annual report to make education of employees in economic relationships more effective. The report stressed the responsibility of citizenship in industry and denounced radicalism.

### Features of the National Metal Trades Convention in New York

Before the holding of the twenty-sixth annual convention of the National Metal Trades Association at Hotel Astor, New York, in the week beginning April 21, there will be a secretaries' conference and an executive committee meeting, Monday morning, April 21, followed by a secretaries' dinner in the evening. On Tuesday morning, April 22, a secretaries' conference and an Administrative Council meeting will be held, and Tuesday noon there will be a joint luncheon of local secretaries, the Administrative Council and branch presidents. On Tuesday evening an alumni dinner and a ladies' theatre party will be held.

The convention proper will convene Wednesday. A buffet luncheon will be held Wednesday noon and the convention banquet will be Wednesday evening. Thursday, the convention will hold its closing sessions. It is planned to have addresses on the subject of taxation, legislation, labor problems, industrial training, and the European situation. A list of speakers has not yet been announced.

Proposed standard sizes of wrench head bolts and nuts are given in tentative report No. 2 of the sectional committee on the standardization of bolt, nut and rivet proportions, which is made up of manufacturers and users organized under the procedure of the American Engineering Standards Committee. The report is being distributed by the Society of Automotive Engineers and the American Society of Mechanical Engineers, which are the sponsor bodies. Standards for round unslotted bolt heads have been also submitted and the committee desires to know how well the standard dimensions meet the needs of both the manufacturers and the users. The standards cover four types of carriage bolt heads and elevator and step bolt heads. Copies of the report may be obtained from C. B. Le Page, 29 West Twenty-ninth Street, New York.

Jenkins Brothers, manufacturers of brass and iron valves, Bridgeport, Conn., have completed a four-story building which will be used in manufacturing iron valves, formerly bought from another company. Owing to this expansion approximately 500 extra men will be employed, nearly doubling the working force.

## COMING MEETINGS

### February

**American Institute of Mining and Metallurgical Engineers.** Feb. 18 to 21. Meeting in New York. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

**National Safety Council.** Engineering Section. Feb. 19. Midyear safety conference. Morrison Hotel, Chicago. G. E. Wallis, 168 North Michigan Avenue, Chicago, director of publicity.

**Southern Metals Trades Association.** Feb. 26 and 27. Seventh annual convention at the St. Charles Hotel, New Orleans, La. W. E. Dunn, Jr., Atlanta, Ga., secretary.

## LE BLOND ELECTED CHAIRMAN

### Cincinnati Machine Tool Manufacturer Heads Niles-Bement-Pond Co.

R. K. Le Blond, president R. K. Le Blond Machine Tool Co., Cincinnati, was elected chairman of the board of directors of the Niles-Bement-Pond Co. and the Pratt & Whitney Co. at the annual meetings of the stockholders of these companies at their office, 111 Broadway, New York, on Feb. 6. James K. Cullen was reelected president of both companies.

Other officers of the Niles-Bement-Pond Co. are: Vice-presidents, Charles L. Cornell and Sanford G. Etherington; treasurer, John B. Cornell; secretary, Charles Stuart Guthrie; assistant treasurer and assistant secretary, E. Jay Edwards, Jr. Directors are: James K. Cullen, Charles L. Cornell, John B. Cornell, R. K. Le Blond, Gordon S. Rentschler, Fred W. Gordon, Sanford G. Etherington, Henry Bertram, Lucius Rossiter, Charles K. Seymour, Edward L. Leeds and George H. Warrington.

In addition to Mr. Le Blond, there are five new directors on the board of the Niles-Bement-Pond Co., these being Gordon S. Rentschler of the Hooven, Owens, Rentschler Co., Hamilton, Ohio; Lucius Rossiter, Terry Steam Turbine Co., Hartford, Conn.; Edward L. Leeds, general sales manager of Niles-Bement-Pond Co.; Charles K. Seymour, assistant general sales manager, and George H. Warrington, a lawyer of Cincinnati.

The officers of the Pratt & Whitney Co. are the same as those of the Niles-Bement-Pond Co., but there are only eight directors as follows: R. K. Le Blond, Sanford G. Etherington, Gordon S. Rentschler, Fred W. Gordon, Lucius Rossiter, James K. Cullen, Charles L. Cornell and John B. Cornell.

Both companies declared the customary dividend of 1½ per cent on the preferred stock. No dividend on common stock was declared, the annual report of President James K. Cullen for the Niles-Bement-Pond Co. and associated companies showing a net loss for 1923, after charging general, selling and other expenses, repairs to buildings and equipment, taxes, and an allowance of \$475,000 for depreciation, of \$860,083.19. Deducting a credit for the prior period and adding the preferred stock dividends gave a net deficit for the year of \$793,990.92. The present surplus is \$8,624,233.35.

"The first half of the year (1923) showed a decided improvement over the prior two years both in volume of sales and prices secured for our products," said President Cullen's annual statement to stockholders. "During the second six months the volume of sales fell off quite decidedly, as was the general experience in similar enterprises. However, I am glad to report that in spite of lessened sales during these latter months, selling prices have been somewhat more satisfactory. The industry as a whole stands much in need of further increase in prices.

"Our losses, while very much less than those of 1921 and 1922, show the need of further advances in prices and for still larger volume of sales. If general business continues to thrive during 1924, I have reason to hope that your company will again be showing profits from its operations.

"Despite the severe losses of the last three years the company is in a thoroughly sound financial condition; its current assets amount to \$13,274,958, while its current liabilities are only \$3,467,263."

#### Business Career of Mr. Le Blond

CINCINNATI, Feb. 11.—R. K. Le Blond, the newly elected chairman of the board of the Niles-Bement-Pond Co., was born in Cincinnati. He served his apprenticeship as a machinist in the old Franklin Type Foundry, Cincinnati, completing his course in 1879. This company manufactured small printing presses, machine tools, type molds and gages used in the manufacture of type. During his apprenticeship, Mr. Le Blond attended the Ohio Mechanics Institute at night, and graduated. After serving five years with the

Franklin company he went to St. Louis, remaining two years with a company doing similar work. He then accepted a position with the Brown & Sharpe Mfg. Co., remaining there a few months, when he returned to Cincinnati and started in business, in 1887, under the firm name of R. K. LeBlond. This business was started in a small room about 50 ft. square on Pearl Street. The products were type molds, gages, small tools connected with the type making industry, and general jobbing work. In 1888, Mr. LeBlond moved to larger quarters at the corner of Second and Plum Streets. In 1891 he commenced the manufacture of machine tools under contracts received from Lodge & Davis, now the American Tool Works. In 1892 he started to built lathes on his own account, the first one being a 14-in. engine lathe. Business expanded rapidly, due to the impetus given to machine tools by the development of the bicycle industry, and in 1897 a new and modern plant was erected in Linwood. This building was enlarged four times subsequently, until it was one of the largest of its kind in Cincinnati. In 1898 the company was incorporated as the R. K. LeBlond Machine Tool Co. The tremendous demand for machine tools occasioned by the world war demanded increased facilities for manufacturing, and the present plant of the company at Madison and Edwards Roads, Cincinnati, was erected in 1917. It is one of the most modern and best designed plants in the world for the manufacture of machine tools.

Though Mr. LeBlond has been the controlling genius in the direction of his company since 1887, he has never lost close personal touch with his employees. For many years he worked at the bench along with his employees for the full working day, keeping his books and doing other clerical work at night. It still is said of him that he is the hardest working man in the organization. He has always been a particular friend of the working man, and never forgets that he was himself one of them. Besides his connection with the machine tool industry, Mr. LeBlond is one of the leaders in civic and financial enterprises in Cincinnati. He is a director of the Union Savings Bank & Trust Co., the Fourth and Central Trust Co., Cincinnati Gas & Electric Co., Cleveland Automatic Screw Machine Co., and is interested as a stockholder in the Rapid Electrotypes Co. and the Multi-Color Type Co. He is chairman of the board of the G. A. Schacht Motor Truck Co., Cincinnati, and has been active in underwriting some of the larger business deals in downtown real estate during the past few years, making possible extensive improvements in the class of buildings erected in this section of the city. His election to the chairmanship of the board of the Niles-Bement-Pond Co., marks a culmination of 27 years connection with the company, as the LeBlond products have been marketed by the Niles interests ever since 1897.

#### Evidence as to Competition of Midvale and Bethlehem Companies

The Federal Trade Commission last week examined three witnesses at the Federal Building, Broadway and Park Place, New York, in its hearing re the merger of the Midvale Steel & Ordnance Co. and the Bethlehem Steel Corporation. These witnesses were C. W. Hodges, purchasing agent, Worthington Pump & Machinery Corporation, New York; Ralph W. Foltz, purchasing agent, Treadwell Engineering Co., Easton Pa., and C. S. Lindsay, secretary and treasurer, Heppenstall Forge Co., Bridgeport, Conn.

All of these witnesses testified that Midvale, Lackawanna and Bethlehem competed for their business prior to the merger of the Midvale, Cambria and Lackawanna plants with Bethlehem, and that since that merger their sources of supply are fewer. Mr. Lindsay said that 50 per cent of the raw material used by the Heppenstall Forge Co. consists of billets 12 x 12 in. or larger and that his sources of supply for these sizes are limited now to the Carnegie Steel Co. and the Bethlehem Steel Corporation.



## JANUARY STEEL OUTPUT

Production Rate 19,580 Tons a Day Larger Than in December—Yearly Rate 41,465,000 Tons

The output of steel ingots in the United States in January rose sharply over that in the last few months of 1923. It attained a rate not far from that prevailing late in August. The increase was 756,170 gross tons over January as compared with a decline in December from November of 270,040 tons. In daily rate the increase was 19,580 tons, comparing with a decline of 6011 tons per day in December from November. The January increase was about 17 per cent against a decline in December of about 5 per cent.

The statistics of the American Iron and Steel Institute indicate a daily rate last month of 133,331 tons, as compared with a daily average of 113,751 tons in December. The January output of companies which made 95.35 per cent of the country's total was 3,432,541 tons which, assuming that the 4.65 per cent not reporting produced the same percentage of the total as in 1922, points to a total January output of 3,599,938 tons. This is an annual rate of about 41,465,000 tons.

The table below gives the production by months for 1923 of the different kinds of steel, together with estimated daily rate for all companies. Following it is a table showing the production by months in 1922:

Monthly Production of Steel Ingots, January, 1924, Reported by Companies Which Made 95.35 Per Cent of the Steel Ingot Production in 1922

Months 1924	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan. ...	2,752,932	667,032	12,577	3,599,938	133,331

Monthly Production of Steel Ingots, January, 1923, to December, 1923, Reported by Companies Which Made 95.35 Per Cent of the Steel Ingot Production in 1922

Months 1923	Open-hearth	Bessemer	All Other	Calculated Monthly Production All Companies	Approximate Daily Production All Companies, Gross Tons
Jan. ...	2,906,892	728,270	9,467	3,822,369	141,569
Feb. ...	2,613,564	669,903	10,797	3,454,918	143,955
March ...	3,046,309	799,525	12,841	4,046,854	149,883
April ...	2,974,579	772,485	13,933	3,944,412	157,776
May ...	3,136,558	847,418	16,719	4,195,800	155,400
June ...	2,821,239	737,845	15,483	3,748,890	144,188
July ...	2,658,449	680,884	11,496	3,514,241	140,570
Aug. ...	2,796,370	701,059	9,326	3,677,771	136,214
Sept. ...	2,539,653*	613,709	8,602	3,316,166*	132,647*
Oct. ...	2,724,371	649,452	9,163	3,547,966	131,406
Nov. ...	2,343,368	616,335	9,309	3,113,804	119,762
Dec. ...	2,130,613	570,004	10,912	2,843,764	113,751
Total ...	32,691,965	8,386,889	138,048	43,226,955	138,993

\*Revised.

### New Pacific Coast Steel Field

The Pacific Sheet Steel Corporation, 120 Broadway, New York, which has recently been incorporated in the State of Delaware, will operate a 6-mill sheet plant at South San Francisco for the manufacture of black, blue annealed and galvanized sheets. Charles R. Hughes, formerly of the American Rolling Mill Co., will be works manager, and G. F. Squier will have charge of sales. The mill is now nearing completion, and it is expected that it will begin operation in April.

### Portable Machine for Numbering Metal

A numbering machine for use in stamping serial numbers in both large and small metal, fiber or parts of machines or plate, that because of their size or shape cannot be conveniently placed in a press, has been brought out by the American Numbering Machine Co., Brooklyn.

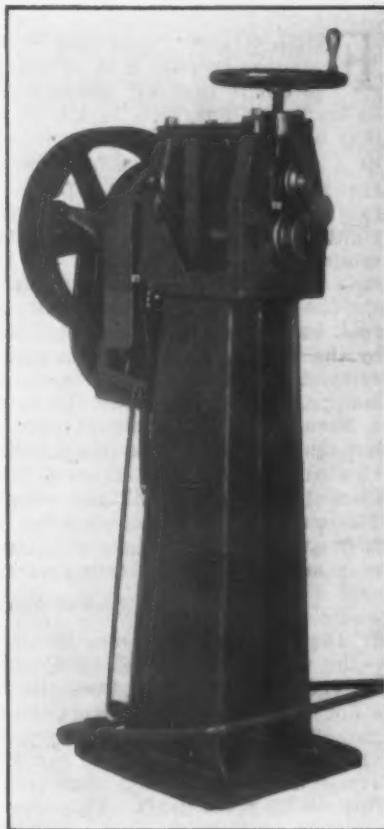
Weighing but 4 lb., the machine may be conveniently carried to work in any part of the shop. It is operated by hand and a hammer is used to imprint the numbers, the shank of the machine being grasped by the left hand and the hammer held in the right hand. A special bottom plate holds the machine in position

while the impression is being made, and a sharp and alined impression is said to be obtained. The gage plate accurately locates the printing position. Steel is used throughout and the wheels employed in the machine are of tool steel, hardened.

### Beading and Wiring Machine

The beading and wiring machine illustrated which has been designed for rolling and wiring the edges of steel wheelbarrow trays, scraper trays and other heavy sheet steel metal parts, has been added to the line of the Yoder Co., Cleveland. The machine is of sturdy construction and is intended to work around a small radius and roll-in wire as large as  $\frac{3}{8}$  in. in diameter. It is provided with a high standard so that the operator may handle large work without interference from the floor.

If the trays are flanged when formed on a press, only two operations are required to roll the wire. First the section is "ued" and then, after laying in the wire, the edge of the tray is rolled down over the wire. Either belt or direct motor drive may be employed and operation of the machine is controlled by a friction clutch. The rolls are adjusted by a hand wheel.



### Progress in Gage Steel Investigation

Length changes during hardening are discussed in the eighth progress report of the gage steel investigation by the gage steel committee, Bureau of Standards, just issued. Hardness tests on the deep-hardening steels are also included in the report.

The length changes of an oil hardening steel have been followed through the hardening transformation. Curves included show that the maximum length change of the steel studied through the transformation of austenite to martensite is one to two times as great as the net change from the original length to the length in the hardened state. The transformation change increases rapidly as the quenching temperature is raised from 775 deg. C. to 870 deg. C., while the net length change actually decreases slightly. It is said to be evident that the net change in length on hardening is no indication of the length changes during the hardening transformation.

In the hardness tests on the deep-hardening steels, the effect of rate of cooling, quenching temperature, tempering temperature, and rehardening on the hardness of two steels has been studied.

Reports that the White Co., Cleveland, had planned to resume passenger car production, discontinued in 1917, have been contradicted in an official statement that the company has no connection whatsoever with the Rollin Motors Co., nor any other passenger car producer.

# Correct Methods of Using Fuel Oil\*

## Analysis of Four Types of Oil Burners, Three Types of Furnaces and Combinations of Furnaces with Burners—Life of Refractories Important

**F**UEL OIL or liquid fuel is one of the fuels most abused because it is so exceedingly easy to build a device that will produce heat. The device may be inefficient but, by a reckless use of oil, fair results may be obtained. The term "oil burner" is a misnomer, as a great multitude of burners are merely atomizers spraying the oil into the furnace. The furnace in this case must mix, gasify and burn the fuel. A device rightfully cannot be called a burner unless it actually completes the combustion of the fuel without external aid; that is, it must be independent of the furnace.

The function of the furnace is not to burn the fuel, but to conserve and distribute the heat developed by the burner. The test of a real burner is its ability completely to burn the fuel in the open, that is, without being applied to a furnace. To meet these requirements a burner must not only atomize the fuel completely, but thoroughly mix the finely divided oil with the correct amount of air. It must then gasify the finely divided particles of oil and completely burn the gas. The gasification and combustion of the finely divided fuel must take place in a small area under high temperature in order to obtain perfect combustion.

### Four Types of Burners

Liquid fuel burners may be divided into four groups—the vapor, mechanical, spray and combustion types.

The *vapor burner* passes the fuel through or over a hot surface so as to convert the oil to a vapor or dry gas. This vapor is then passed through a nozzle or allowed to escape from the hot surface and mix with atmospheric air, which usually is induced into the furnace by stack draft. This type of burner will operate only on the light fuels, such as kerosene, distillate and some grades of furnace oil. Its capacity is limited by the vaporizing capacity of the hot surface that the fuel passes over.

It is more or less difficult to control the temperature and atmosphere with this burner. The generating surfaces frequently collect carbon, due to the "cracking" of the fuel. This reduces the capacity of the burner and frequently clogs it up entirely. The field of this burner is limited to small capacities, such as small portable torches and domestic heating. The big problem with this burner is the control of the temperature of the vaporizing surface and the proper mixing of air and vapor.

The *mechanical burner* atomizes the fuel by passing it through small orifices under high pressure. These orifices are usually placed tangentially to an expansion chamber, so as to set up a rapid rotation. The velocity and rotation atomize the fuel and also help to mix the finely divided oil with the induced air. Air for combustion is drawn into the furnace chamber through small ports around the burner by the effect of the stack or by pressure set up in the furnace room. This burner finds almost exclusive use in the marine service because it requires very little auxiliary equipment.

This type of burner is not well adapted for industrial heating because the operating range is very narrow, but is suited to high capacities, such as 50 gal. per hr. and over. A new type of mechanical burner recently developed is the rotating cup atomizer. The oil is fed into the rotating cup by a small stationary tube. The cup is rotated by an electric motor or by a blast of air that passes vanes on the periphery of the cup. This type of burner depends on fan and induced air for combustion.

The *spray type burner* is the atomizing device used

almost universally in the industries. Atomization is accomplished by passing the oil through a nozzle in the path of a jet of air or steam. The velocity of the air or steam tears up the oil into a spray. This spray or atomized mixture is passed into the furnace for combustion. The velocity of the atomized mixture induces additional atmospheric air for combustion. The spray type of burner can be classified as follows:

- 1.—The high-pressure burner that operates on air or steam, usually between 50 and 125 lb. per sq. in.
- 2.—The medium-pressure burner that operates on air pressure from 1 to 15 lb.
- 3.—The low-pressure burner that operates on air between 6 and 14 oz.
- 4.—The high-low-pressure burner that atomizes with high-pressure air and uses low-pressure air for combustion.

The closed type combustion burner operates on low-pressure air between 8 and 12 oz. per sq. in. This air atomizes the fuel and also supports combustion. As the burner, being closed, does not induce any atmospheric air, there is no induced air variable to contend with in balancing the fuel and air. This burner atomizes the fuel over knife edges so located in the jet of air as thoroughly to mix the fuel and air for combustion.

The first stage of combustion is gasification or partial combustion, that is, burning to CO, which takes place under high temperatures, due to the small volume of the combustion chamber. This chamber is lined with refractory material, which is continually storing up heat, and in turn radiating it back to the atomized oil for gasification. A secondary supply of air is then fed in to the partially burnt gases in such a way as to mix thoroughly, thus completing combustion within the burner.

The combustion type burner makes it possible to burn the fuel with practically no excess air, due to the thorough mixing and burning of the fuel in a small space under exceedingly high temperatures. As all of the fuel and air that enters this type of burner is under control of valves, it is easy to obtain the correct balance. Combustion being complete in the burner eliminates hot spots in the furnace, thus increasing the life of the refractory lining.

The ordinary burner, or more properly the atomizer, being only an oil sprayer, must depend on the furnace for gasification and combustion of the fuel.

### Three Types of Furnace

There are three general types of furnaces used at present to meet this requirement: the under-fired, the over-fired checkered arch furnace and the side-trench fired furnace.

The *under-fired* furnace provides a combustion space below the furnace hearth, to which the burners deliver the atomized mixture with induced air. A flash wall is provided in the path of the atomized mixture for mixing and reducing the velocity to a point where combustion can take place. This space below the furnace hearth must mix, gasify and burn the fuel and then deliver it to the heating chamber above. The high temperatures of combustion under the tile floor greatly reduce the life of that floor; it frequently fails during operation, dropping the charge into the combustion chamber. This large combustion space increases the heat loss of the furnace and also tends to reduce the efficiency of combustion. The rate of heating is comparatively slow, due to the large volume of brick that must be heated by the hot gases before reaching the heating chamber above.

The *over-fired* checkered arch type of furnace provides a combustion space above the heating chamber. The atomized mixture is directed against a flash wall

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for reducing its velocity and further mixing for combustion. The products of combustion fill this space and then escape through the many ports in the arch down to the heating chamber proper. The vents are placed along the side walls at the furnace floor.

The temperature in this type of furnace is ordinarily uniform, with small low charges. With heavy charges there is a tendency for the heat to take the path of least resistance and flow directly to the vents, due to the lack of a forced circulation. The rate of heating is usually slow, due to the large amount of brick that must be heated in the combustion chamber above. This, in addition to the larger radiating surface, reduces the efficiency.

The *trench-fired* furnace has the combustion chamber along one side of the furnace. The heat from this chamber is passed over a bridge wall to the heating chamber. The vents are generally located on the opposite side, thus carrying the hot gases over the material to be heated. This furnace has the same general characteristics as the under-fired furnace.

The temperatures in this type vary considerably from the bridge wall to the opposite side. The areas next to the bridge wall are frequently cold as compared to the vented side. Wide furnaces of this type are sometimes fired from both sides and vented in the arch or rear wall.

#### Over-Fired Furnace Most Efficient

The over-fired, open-chamber furnace is the most efficient and fastest heater. Its limitation has been the straight type of atomizing burner, which depends on the furnace for combustion. The disadvantage of this furnace with the common burner have been unequal heating and improper control of temperature and atmosphere, with heavy scaling and pitting of the steel.

The combustion type burner has eliminated all of these disadvantages and still maintained the other advantages, such as rapid heating and high efficiency. The over-fired, open-chamber furnace of the proper design and equipped with a proper number of combustion type burners will produce good temperature uniformity with close control of temperature and atmosphere.

A heat-treating furnace, for example, 42 in. wide, 84 in. long, with a 24-in. high door, will operate within 5 deg. Fahr. plus or minus in the heating zone. A 6-ft. wide by 14-ft. long by 3 ft. 6-in. high car-type annealing furnace with a 12-ton charge will operate within 10 deg. plus or minus in the same plane of the charge.

The combustion type burner is applied to the upper zone of the furnace chamber, with space provided above the material heated for circulation and distribution of the hot gases. The vents, arranged to aid the circulation of hot gases produced by the burner, are located close to the furnace floor, so as to vent first the coolest gases from the heating chamber. The vent gases are then carried under the tile floor and up through passages in the side walls. Thorough circulation of the hot gases in the furnace, with venting of the coolest gases first and then further reducing their temperature by heating the floor, gives maximum heating capacity and efficiency.

Tests were made some time ago at Chicago on an old furnace with high-pressure burners with an output of 49 lb. of steel per gallon of oil. The furnace design was then changed to conform with the combustion burner design and the old high-pressure burner was used with an output of 62.5 per gallon of oil. The combustion type of burner was then applied, with an increase to 72.2 lb. per gallon of oil. In this instance the proper furnace design showed a bigger saving than the application of the combustion type burner.

#### Insulating and Refractory Brick

The refractory material used in the construction of a furnace also affects the efficiency, that is, the amount of heat lost through the furnace walls. Ordinary fire brick has a certain insulating as well as refractory property. This insulating property is measured in terms of thermal conductivity—the number of B.t.u. that 1 sq. ft. of surface 1 in. thick will conduct per degree per hour. The thermal conductivity of the average fire brick is between 10 and 12.

There are also different insulating materials available for reducing the furnace losses further. As this brick is not a refractory, it must be placed in back of the fire brick. The average thermal conductivity of this class of brick is about 1; that is, a wall 1 in. thick of insulating brick is equal to about 10 in. of fire brick. Insulating brick pays the biggest returns on furnaces that are operated continuously. Furnaces used for a few hours each day will show no savings with insulating brick, because the heat would probably penetrate only the fire brick in that period. Therefore the insulating brick would have no flow of heat to resist.

Furnaces used for very high temperatures, such as welding, should not ordinarily be insulated, as the fire brick needs to be exposed to the air for cooling, so as to keep it below its melting point. The color of the surface is also a factor in the heat loss of a furnace. Dark colors, such as black, sometimes radiate enough heat to balance the retarding effect of the insulating brick used in the furnace wall. Light colors, such as white or light grays, radiate very little heat. Light shades of gray are commonly used for industrial furnaces.

#### Air Under Low Pressure

Low-pressure air, which is the atomizing and combustion air in the combustion type burner, has several marked advantages over high-pressure air. The cost of producing high-pressure air is considerably more than that of low-pressure air. One horsepower will, under average conditions, produce about 5 cu. ft. of compressed air at 80 lb. per sq. in. A good high-pressure burner will induce about 5 cu. ft. of free air per cu. ft. of compressed air; that is, each horsepower will develop about 30 cu. ft. of air available for combustion. One horsepower with a fan type blower will develop about 200 cu. ft. at 10 oz. or 6.6 times as much per horsepower. The initial cost of compressor is many times that of an equivalent low-pressure fan blower. The maintenance cost will be exceedingly low with the fan-type blower as compared to the compressor.

#### Examples in Practice

Following are a few examples showing the saving that can be effected by using scientific oil burning equipment:

1.—A test conducted recently in a plant making staybolts was for the purpose of determining whether it would be advisable to install modern furnace equipment or continue with the existing equipment. The furnace chosen was a 42 in. x 12 in. x 3 in. under-fired forging furnace. This was equipped with three low-pressure inducing type burners. This furnace turned out 5.88 lb. of iron per pound of oil, or used 46.7 gal. of oil per ton of metal heated.

The new furnace was a 42 in. x 13½ in. x 2½ in. over-fired forging furnace equipped with one combustion type burner. This furnace produced 10.05 lb. of iron per pound of oil, or used 26.4 gal. per ton of metal heated. The saving in fuel was 43½ per cent. The material heated was free from scale, with no traces of pitting. The heavy scaling and pitting of the old furnace had been the source of considerable rejections and other trouble.

2.—An 8-ton car type annealing furnace designed for combustion type burners was recently installed in a Pacific Coast steel foundry. The oil consumption per ton of castings annealed was checked over a period of several months, the average being 13.65 gal. per ton. The average cost of fuel oil during that period was 5.6c. per gal., which made the average cost of annealing steel castings 78c. per ton.

A neighboring concern had a car-type annealing furnace and high-pressure burners. This showed figures as high as 70 gal. per ton of steel castings annealed, or a cost of \$4.25 per ton. This company has recently installed a 12-ton electric furnace to reduce annealing costs and improve the quality of the castings. With this furnace the cost had jumped to \$7.50 per ton of steel annealed.

3.—A steel foundry in Ohio recently equipped a \$20,000 electric car-type annealing furnace with two combustion type burners, effecting a saving of \$3.50 per ton below the cost of heating the furnace with electric power. This furnace, although not properly designed for combustion type burners, consumed only 18 gal. of fuel per ton of steel annealed.

4.—Comparative tests were made between the high-pressure rivet forge and the low-pressure over-fired combustion type rivet forge on one of the large Eastern railroads. The total cost of operating each forge, including fuel and air, at a capacity of 720 ¾ x 3 in. rivets per hr., was checked closely. The high-pressure rivet forge cost 38-44c. per hr. to operate. The over-fired combustion type rivet forges operate at a cost of 21.16c. per hr., or a saving of 46 per cent. There were also other savings—less burnt rivets, cleaner rivets, fewer rejections, softer rivets and less heat radiated from the forge, making the working conditions more favorable.

## BELGIANS IN GOOD POSITION

### Orders for Two or Three Months and Exchange Situation Permit Holding Prices

ANTWERP, BELGIUM, Jan. 23.—In general prices have been better maintained during these last days and about the same prices as last week have been quoted at today's metal exchange. Notwithstanding the general opinion that a further reduction may follow, good business in iron and steel has been done at current prices. Of course the high rates of exchange have made business with abroad much easier and if the market prices seem to have gained a certain stability this is really due to exchange rates, as follows: \$1 is quoted 24.50 Belgian francs; £1 is quoted 103.60 Belgian francs.

On the other hand, if it is true that these high rates of exchange are responsible for keeping our prices in a better position, especially when expressed in our national money, we must reckon with the last reductions for coke in France and in Germany. On account of this latter reason competition from our neighbors is still strong in most departments. They quote lower prices than Belgian works. But Belgian makers are for the moment in the better position because most of them, especially for steel products and finished iron, are still provided with orders for a further two to three months and therefore can resist further cutting of prices.

**Pig Iron.**—Even pig iron makers, notwithstanding large stocks at the furnaces, keep to their prices and refuse to follow Lorraine and Luxemburg makers, who offer their high phosphorus foundry pig iron at Belgian fr. 400 to 405 (\$16.59 to \$16.80) delivered at consumers' works or f.o.b. Antwerp. This is for iron of an analysis as follows:

Si..... 2.5 to 3 per cent	Mn..... 0.4 to 0.6 per cent
S..... 0.05 per cent max.	Ph..... 1.7 to 2 per cent

It is actually equal to \$17 f.o.b. Antwerp and something over \$20 c.i.f. New York, duty unpaid. Moreover, this price seems to be interesting for America, as large orders have been booked with the Atlantic Coast for this class of pig iron at prices approximating these figures.

Belgian makers still quote for their No. 3, equivalent quality, fr. 415 to 420 (\$17.21 to \$17.42), but they cannot at this price obtain a large share of the orders available, except when urgent delivery is necessary and for a small quantity.

Semi-phosphorus foundry iron with

Si..... 2.5 to 3 per cent	Mn..... 0.4 to 0.8 per cent
S..... 0.05 per cent max.	Ph..... under 1 per cent

is keeping stronger and fr. 490 f.o.b. Antwerp per metric ton (\$20.32 per gross ton) is, for the quantity

### Steel in the Ruhr Valley

COBLENZ, GERMANY, Jan. 22.—Persistent reports that there were 4,000,000 tons of finished steel products in the Ruhr which the French were going to release and sell in world markets have considerably alarmed the British iron and steel industry. France made reply to the anxious representations as to what she intended to do with all that steel and iron by suggesting that an investigation be made. The investigation report shows that there is really no cause for alarm; instead of 4,000,000 tons, there is in reality 1,800,000 tons, of which one-third is scrap, one-third is semi-finished products, and the remaining one-third finished products. In any event, it is explained, the scrap will not leave the Ruhr, where it was needed by the steel works. The remainder will be absorbed in monthly shipments not exceeding the shipments of 1922 for corresponding months. Of course, the finished products are manufactured to the metric scale of measurement.

As the works in the Ruhr made use of their idle time to put everything in good condition, they are in excellent shape and, with the men now reported to be going back to work en masse, it is predicted that operations will be under full headway in a few months. There is some disorganization, of course, in the selling end, and it may take somewhat longer to regain business that has been lost.

available, considered low. This figures to about \$25 c.i.f. New York.

Belgian hematite pig iron (American low-phosphorus pig iron) is quoted fr. 535 f.o.b. Antwerp, equaling \$22.19 or 10's., i.e., only a little higher than English East Coast hematite. Belgian high-manganese hematite pig iron is quoted at nearly the same price. Thomas pig iron of the usual quality costs fr. 400 to 410, or average \$16.80 f.o.b. Antwerp. Lorraine and Luxemburg makers quote the same prices for this class of pig iron. Large demands for basic pig iron are on the market from England but as far as we know the price of 80s. f.o.b. Antwerp has not yet led to much business.

**Finished Steel.**—Prices for iron and steel products f.o.b. Antwerp are approximately as follows:

	Fr.	
Commercial iron No. 2.....	725	\$30.80
No. 3.....	750	31.90
No. 4.....	800	34.00
Heavy Thomas sheets.....	700	29.80
Thin Thomas sheets.....	1,100	47.00
Thomas sheets 5 to 10 mm.....	1,250	53.20
Heavy S. M. sheets.....	720	30.60
Galvanized sheets 1 mm.....	1,900	81.00
Bar iron, basis.....	650	27.65
Angles, basis.....	650	27.65
Rails.....	700	29.80
Beams and U-iron, basis.....	600	25.50
Rods.....	825	35.10
Thomas ingots.....	500	21.25
Thomas blooms.....	530	22.60
Thomas targets.....	600	25.50
Thomas billets.....	570	24.20
Hoop iron, basis.....	975	41.50
Rounds.....	1,250	53.25
Squares.....	1,275	54.30
Spring steel.....	1,250	53.25

Fortunately business, as regards heavy sheets, has been better. German quotations were still £7 5s., while Belgian prices reached only fr. 700, being £6 15s., with fr. 720 to 725 for home consumption.

Bar iron is quoted about £6 5s. f.o.b. Antwerp, i.e., at the same level as German and French prices. Competition of course remains strong and in consequence one may not yet be sure that quotations are at their bottom.

**Semi-Finished.**—Prices for semi-finished products are entirely uncertain. Belgian products of this class are scarce and prices as quoted by Luxemburg and French makers on the Belgian market and for export may easily go higher on account of the large purchases made in these countries by Germany. Today's prices for 4-in. billets may be considered to be \$23.80, with \$24.60 for billets of 2-in., both prices f.o.b. Antwerp. The same better situation exists for finished iron products. Prices are strong and point higher.

**Coke.**—Demand for coke remains good; prices are unchanged, i.e., fr. 215 for the furnace quality, or \$8.92. The coke Syndicate will soon be reestablished on a new basis, as decided at the last meeting of Belgian coke makers.

### February Meetings of Mechanical Engineers

Among the meetings scheduled by various sections of the American Society of Mechanical Engineers to be held in the near future are the following:

Birmingham, Feb. 20, at Hillman Hotel. General Topic: Material handling. Water transportation, by H. Key Milner. In pipe foundry, by C. D. Barr. Traffic facilities of Birmingham, by O. L. Bunn.

Cincinnati, Feb. 21, at Literary Club Rooms. Waste in industry, by L. W. Wallace, secretary American Engineering Council.

Meriden, Feb. 20, Home Club at 8 p. m. The result of a test to determine the effect of temperature on the shock resisting properties of the various compositions of steel, by F. C. Langenberg, director of laboratories Watertown Arsenal. X-ray examination of metal, by Col. T. C. Dickson, commanding officer of Watertown Arsenal.

New Britain, Feb. 21, at High School Hall. Belting and belt transmission, by Louis V. Arny, Leather Belting Exchange, Philadelphia.

New Haven, Feb. 18, at Mason Laboratory, Yale University. Personnel management, by Prof. H. B. Hastings, Yale University.

Washington, Feb. 29, at Cosmos Club. Engineers participation in public affairs, by L. W. Wallace, secretary American Engineering Council.

Waterbury, Feb. 21, at Hotel Elton, dinner meeting. Recent aeronautical developments and their practical meaning, by Prof. E. P. Warner, Massachusetts Institute of Technology.



# Pulverized Coal for Open-Hearth Furnaces

## Comparisons with Producer Gas and Fuel Oil—Use in Air and Regenerative Furnaces and Soaking Pits

BY W. H. FITCH\*

THE article by R. H. Lowndes on "Pulverized Coal in Open-Hearth Furnaces," in THE IRON AGE of Dec. 27, 1923, is interesting, and suggests the following discussion.

Sufficient reason is given by the author to indicate that the furnace design is responsible for the lack of continuous operation on a basis that is as attractive as desired, and which might be expected from a furnace of better design. However, a study of this and other papers published regarding the plant referred to indicates that pulverized coal compares favorably with producer gas.

### Comparison with Producer Gas

Referring to table of Mr. Lowndes' paper, we find the average cost of pulverizing and gasifying a ton of coal is about equal, while the cost of repairs (presumably furnace repairs) is \$1.68 for pulverizing and 96c. for gasifying. Average fuel consumption per ton of steel poured shows in favor of gasifying by a margin of 88 lb. The difference in sulphur contents of steel is given at 0.02 per cent, approximately. These are the principal items of consideration and are intended to explain why pulverized coal as a fuel was discontinued.

Taking the cost of repairs, we find 18,409 tons of steel produced at a cost of \$12,329 during the period given; therefore, the cost per ton must be 67c., actually 29c. per ton less than producer gas fired furnace costs given. The difference in sulphur contents is not damaging evidence, as the specifications for steel made at this plant do not call for less than 0.06 per cent as a rule, and 0.04 per cent sulphur steel has been made without difficulty when necessary.

The coal used at this plant was screened during the several years the furnace in question was fired with pulverized coal. It was the practice to pulverize the screenings, the lump coal being gasified. The difference in market value of the two sizes of coal is about 50c. per ton as a rule, although at times in many districts slack of a good quality is obtainable at a very much lower price than lump coal.

In the case of pulverized coal, 100 per cent of the heat value of the coal is projected into the furnace, while in the gasification process there is an average loss of 25 per cent of the heat value of the coal. Practically almost any kind of coal, analyzing within certain specifications, can be used when pulverized, whereas an attempt to gasify coals, which can be pulverized and used satisfactorily, would cause trouble of a nature familiar to all gas producer operators. In any event, they do not recommend the use of slack.

### Per Ton of Ingots Poured

Regarding pulverized coal consumed per ton of ingots poured, we find records of 441 lb. of coal (all stock charged cold), while 660 lb. of coal was gasified per ton of steel during a like period. It was pointed out that the cost of labor in keeping the checkers clear in the pulverized coal-fired furnace was more than offset by the greater tonnage produced in this furnace over the gas-fired furnace.

In the period under discussion the coal consumption is higher than past averages, probably due to reduction in tonnage compared with what the furnace is capable of. However, fuel ratios of 3 to 1—666 lb. of coal per ton of steel poured—are obtained in non-regenerative furnaces with pulverized coal, as referred

to later in this discussion, and obviously are not to be considered the most economical result.

Study of the operating costs of the two plants at capacity shows that four men are required 24 hr. a day to gasify 72 tons of coal as compared with two men 24 hr. a day to pulverize 160 tons of coal. In this particular instance more labor is required for gasifying, due to the producers being hand poked and all the ashes being removed by hand. On the above basis the cost of labor would be 53c. per ton for gasifying and 12c. per ton for pulverizing, figuring labor at 40c. per hr. (Cost of unloading coal the same in either case.)

Power required for crushing, pulverizing, drying and distributing is 18 kwhr. per ton compared with 5 kwhr. per ton of coal gasified. This item obviously is in favor of gasification; however, it is not an important one, all economies considered.

Steam is required to gasify coal and allowing 1/3 lb. of steam per pound of coal gasified, there is a cost of 20c. per ton of coal gasified. Repairs per ton of coal pulverized and gasified are about equal.

At the Atlantic Steel Co.'s open-hearth department there is a battery of semi-mechanical gas producers, having a capacity of approximately 6000 lb. of coal gasified per hour. Joining this gas house is the pulverizing plant having an hourly capacity of 14,000 lb., at stated fineness. The cost of building the two equipments is in favor of pulverized coal on a tonnage basis, by a wide margin. Therefore, the annual interest and depreciation charge compliments powdered coal.

Cost of the Two Fuels Per Ton of Steel

	Producer Gas	Powdered Coal
Power .....	0.05	0.18
Labor .....	0.53	0.12
Repairs .....	0.08	0.08
Dryer fuel .....	...	0.05
Steam .....	0.20	...
Furnace repairs .....	0.96	0.76
Loss due to drying, etc. ....	...	0.20
	1.82	1.39

NOTE: 1c. per kwhr.  
Coal for drying figured at \$5 per ton.  
No overhead included.

If to the above table figures are added to cover cost of fuel that can be used in the respective methods, and this may easily be a very large item in dollars, also the interest and depreciation charges of the two complete units, furnaces and fuel equipments, the net results for pulverized coal will be more attractive.

Referring again to Atlantic Steel Co. and other like situations, the open-hearth furnace changes desired are of a physical nature. For instance, if the rearrangement of brick in the checker chambers is made to avoid choking with ash, a loss of heat results. On the other hand, the slag chamber is probably small, and to increase the capacity of this part of the furnace requires the moving of building columns which is out of the question; therefore, it is not practical to make further improvements in these particular furnaces. Waste heat boilers used in many instances are inadequate.

In one plant there are several large furnaces which were built for producer gas and fired with natural gas. (Producers were never installed.) Subsequently, natural gas supply became uncertain and pulverized coal equipment was installed. The results of pulverized coal firing show the usual limitations found in furnaces of this design, resulting in the use of tar and gas (coke oven

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and natural), making powdered coal an emergency fuel. Different types of burners are used to suit the various fuels. The number of heats that can be made with pulverized coal without cleaning slag pockets and checkers is known and, by observing these rules, pulverized coal is used periodically with results that are very satisfactory.

#### In Regenerative Furnaces

Regenerative furnaces have been built and operated with pulverized coal, with slag chambers of suitable capacity and fitted with car bottom. Extra cars were built in emergency to provide for frequent removal, although in practice the extra cars were not needed, it being found necessary to remove the two furnace cars once a week only, 20 min. being required for the operation. The cars were lined with fire brick in a manner permitting them to be removed with the slag. The checker chambers were of large cubical contents, with ample space above and beneath the checkers so that refuse could be precipitated to the bottom of the chamber, where it could be removed during periods when the furnace was down for repairs. The procedure as regards cleaning top section of checkers, where the fine ash accumulation was most perceptible, was to blow or clean with an iron through doors provided for this purpose. The cleaning period was usually at a time when making bottom.

Undoubtedly the greatest progress made in the art, due to design of slag chamber and regenerative chamber, was made at this plant. However, after several months of operation the making of steel was discontinued, one of the larger plants of the company being sufficient to supply all of their requirements since that time.

#### Compared with Fuel Oil

As other fuels are mentioned, it is in order to refer to instances where fuel oil had been used, and compare results with powdered coal firing used at present. There are a number of furnaces operating with pulverized coal today which have been operating with this form of fuel for several years. The owners say that the results with pulverized coal are satisfactory to a degree that does not warrant the expense of installing gas producers.

Detailed discussion of operating conditions with furnaces re-designed to use pulverized coal, by the writer, was published in THE IRON AGE, Dec. 25, 1919. To the best of his knowledge, little if any changes have been made in the design of existing open-hearth furnaces for pulverized coal firing since that date.

Steel melting furnace operation with pulverized coal as a fuel has not made progress in proportion to other types of metallurgical furnaces using this fuel, due to the fact that open-hearth furnaces used were designed for producer gas and limitations are involved in changing the design to make them suitable for pulverized coal.

Work has been done which can be used for making comparisons in furnace designs for steel melting, and it is not improbable that very considerable savings in cost of building furnaces for powdered coal will be effected, and produce results which will compete with best practices known today with other fuels.

During the past three or four years a number of plants manufacturing malleable iron castings have installed pulverized coal machinery to serve their melting and annealing furnaces. About 75 melting furnaces are fired or being equipped with pulverized coal. The fuel consumption per ton of metal poured in these furnaces is variable on account of the difference in furnace capacity, from 10 to 30 tons. However, 660 lb. of coal is consumed per ton of metal in the smaller furnaces, atmospheric temperature air being used for combustion. These figures compare favorably with those given for the 50-ton furnace at the Atlantic Steel Co., where air for combustion is preheated.

#### In Air Furnaces

The attractive results obtained with pulverized coal firing in air furnaces has led the operators to inquire into the possibility of conserving waste-heat losses

where the gases go to the stack direct. (528 lb. coal per ton of metal poured where furnaces operate in conjunction with waste-heat boilers.) A study of the problem is sufficiently advanced to warrant the statement that 1000 deg. Fahr. preheating of combustion air can be obtained at a cost of furnace construction commensurate with the economies effected. This refers to a recuperative non-reversing flame type of air furnace, suitable for making 15-ton heats. Incidentally, these studies have led to the design of a furnace in which the flame may be reversed periodically, making the process applicable to furnaces of much larger capacity. These designs will be published in the near future.

Experience obtained in building and operating melting furnaces above referred to has furnished data which makes it possible to build a regenerative furnace wherein all molten ash, as well as ash in the dry form, is removed without interfering with the operation of the furnace. Correct velocities of gases through the furnace insure maximum life of refractories expected in furnaces operating at flame temperatures required for making steel. Employing the waste-heat gases for preheating the air for combustion to 1000 deg. Fahr. is equivalent to reducing the fuel consumption about 20 per cent, or using 528 lb. of coal per ton of metal poured. To this additions can be made in the case of a furnace that is continuously operated, and where removal of roof each heat, as in the case of the air furnace, is not experienced.

#### In Soaking Pits

With reference to soaking pit furnaces fired with pulverized coal at the plant under discussion, the conditions under which they were designed and installed accounts for any disadvantages compared with producer gas. The gas velocities are too high, setting up undesirable conditions of heating, while the fuel consumption is undoubtedly higher than will be found with producer gas. Temperatures obtained could not be produced with producer gas using atmospheric temperature air for combustion, as is the case with pulverized coal firing. The space available for these furnaces, their capacity and the comparatively low cost of installation, make pulverized coal firing attractive. Undoubtedly recuperators could be installed in these furnaces, which would result in economy of fuel.

An electric steam generator has been installed in the Hudson Falls, N. Y., plant of the Union Bag & Paper Co. The generator, which was built by the General Electric Co., is rated at 500 h.p. and designed to generate steam at 100 lb. pressure. The generator operates in parallel with fuel-fired boilers, but in normal times the latter carry the steam load. The generator is located in the same room as the fuel-fired boilers and takes up a floor space of approximately 6 x 10 ft., with a 24-ft. headroom for the pump, shell and primary switchboard panel. No increase in boiler room force was necessary.

In the first year of the Bethlehem Steel Co.'s pension system, \$254,675 was paid to superannuated employees, President Eugene G. Grace has announced. In origin the plan affected only employees of the mills, but last April it was extended to include all subsidiary companies. By the close of the year 739 employees had retired. Those eligible for pensions were required to report at least 25 years' service with the company. The minimum age for retirement was 65 years.

Freyn, Brassert & Co., Chicago, have been engaged to do the engineering work in connection with preparing plans and estimates for the new blast furnace of the Central Steel Co., Massillon, Ohio. It is expected that bids will be asked for shortly.



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# THE IRON AGE

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## A Rebound in Steel Production

**A**N increase of 17 per cent from one month to the next in the rate of steel production is a decidedly novel performance, even for an industry that is notorious for changes in its activity. The mere upward turn in production in January is an event, since in eight consecutive months production had decreased. It may be granted that a seasonal influence made December production light, but the January rate was 11 per cent above the November rate and was slightly above the rate in either October or September.

A precise sketch of the course of steel ingot production is furnished by the use of relatives. In the presentation below two sets of relatives are used. The first takes the average daily rate of production in the calendar year 1923 as 100. The second takes the actual practical capacity, as estimated in this department of THE IRON AGE of Jan. 10, 1924. The production in 1923 was 43,239,369 tons, or 139,033 tons daily, and the capacity taken is 53,500,000 tons a year, or 172,026 tons daily.

Relative Steel Ingot Production			
1923	1923 = 100	Capacity = 100	
January	102	82	
February	103	84	
March	108	87	
April	113	92	
May	112	90	
June	104	84	
July	101	82	
August	98	79	
September	96	77	
October	95	76	
November	86	70	
December	82	66	
Year	100	81	*
1924			
January	96	78	

The top rate in ingot production was that of April, 157,776 tons daily or 49,000,000 tons a year. Production decreased continuously for eight months thereafter. The December rate was 27.9 per cent under the top rate and the January rate was 15.5 per cent under the top rate. Thus in one month more than half the loss in rate of operations of eight months was recovered. As production was increasing during January, however, the rate at the close of the month was higher than the month's average, so that the rate now may be two-thirds the way up to the top rate, or say 10 per cent under it.

Much attention has been given to the fact that some steel interests are disposed to stock unfinished steel, as a remedy for shortage of steel at finishing mills later on. While the tonnage

stocked may be important in its particular connection, it should not be inferred that the operation has much influence on the total production here considered. Stocking would be liberal and on an unprecedented scale if it equaled 10 per cent of production. Such stocking by a steel interest at 10 per cent of its capacity for three months would give a 10 per cent extra supply for three later months and would be in excess of anything likely to be attempted, but if undertaken by one-half the steel industry, would represent only 5 per cent of the total.

Sheet bars are particularly convenient to stock, but cannot involve any great proportion of the total steel output. The Steel Corporation's consumption of sheet bars represents, say, 12 or 13 per cent of its total steel, so that producing a 50 per cent excess of sheet bars, which would be impossible, would represent only 6 or 7 per cent of the corporation's total output, or less than 3 per cent of the industry's output. Evidently the heavy increase in steel production in January was chiefly against shipments of finished products.

## British Patent Practice Dispute

**A**MERICAN manufacturers and inventors are concerned in a new practice of the British patent office which has assumed what the patent solicitors of Great Britain contend is a judicial power, unwarranted by the statutes, in deciding whether or not an invention is entitled to a patent. Under the new ruling, the applicant must show that his invention contains a "manner of new manufacture" and does not contain a "want of subject matter," else protection will not be accorded. The Chartered Institute of Patent Agents proposes to bring strong pressure upon the Board of Trade in the effort to remove the practice, the argument being that it is not the business of the examiners at the patent office to consider either of these grounds as a reason for rejection.

A like issue was created in the United States some years ago and was threshed out in the courts in the rotary engine cases. The issue was then how far the specifications of an invention must go to determine whether it was workable. The court held it was unnecessary to go beyond the point of demonstrating that an invention work



mechanically, which was to say in the case of an engine, that it turn over under its own power. A similar interpretation of the statute is sought by the British patent agents, which would mean, according to the *Engineer* of London, that "patents for inventions would be sold across the counter like postage stamps."

Patent attorneys of the United States are viewing with interest the controversy concerning the British law, for one reason because more American inventions are patented in Great Britain than in any other foreign country, with the possible exception of Canada, and for another reason that, in spite of precedents established here, the practices of the British patent office may find entrance into American legislation and into the practices of the patent office at Washington.

### Appraisals of Prosperity

**T**AKING the form of predictions in the festive holiday season there were many appraisals of what "business" would be like in the year 1924. Since then we have had some economic reviews of our condition, involving appraisals of the year 1923. There is a marked difference in viewpoint in the two sets of appraisals. Both in well considered utterances and in the talk of the street one observes a wide range of meaning for the commonly used word "prosperity."

It seems we have one conception when we think of the collection of people that make up our population and another when each one is thinking of himself. The individual usually knows precisely what his income has been. He may know what his expenditure is, perchance by its equaling his income; but he has no appraisal of the quantity of goods and services he received. He cannot, then, strike a balance and observe how much he has progressed. It makes a difference at the end of the year whether a given sum of money has been spent for candy or carpets, for ice or for a more economical refrigerator. When a prediction is made at the year-end that business in the new year will be "good," it means to the individual that his income is going to continue, hence he considers that he will be prosperous.

When the economist reviews the year he has a different viewpoint. He wants to know if the material wealth of the country has increased and its facilities improved. Have we better houses and are they better furnished? Can we make a ton of steel, or put it into employment, with less labor? Do we produce more power with the average ton of coal, or haul freight with less effort?

From the economist's point of view there is criticism of recent and prospective times that, while the income of the whole people is running high, the expenditures are chiefly for current supplies and services, an unusually small proportion being left for improvements that will make things easier and better in the future.

It is a form of prosperity, of course, for every one to have a job and an income, for sometimes large numbers have not. If all the income has to be spent on living there is no fundamental reason why the thing should not go on forever. The in-

dividual would call this "prosperity" until he found he was getting nowhere.

The individual is unable to take stock from time to time of his position. He may or may not be able to buy a better article for one hour of his income, whatever that may be or however it may vary, than he did a year ago. He cannot observe and tabulate all such details. But if a new and better factory is built to make that article he may get something better. That is prosperity and advancement for him, but he does not think of prosperity in that light.

As a people we shall be prospering if we build new and better factories, improve and extend our railroads, utilize water power, construct bridges and build more economical power plants. At the end of a year we shall have better facilities whereby we can do our work more easily and receive more goods or better service when we pay out the money received, whatever the amount may be, for an hour or a day that we have worked. That is progress, advancement or prosperity as the economist views it, and it is prosperity as much for the individual as for society as a whole. The individual, however, cannot make the appraisal. His conception is having a job, and if possible at more dollars per day or week.

### The Psychology of Our Radicalism

**T**HE primary purpose of taxation is to obtain means wherewith to meet the expense of government. At the present time the needs of the American Government in all of its forms are for about 7½ billion dollars per annum. With a national income of about 60 billions per annum, the needs of the Government are for about 12½ per cent thereof. The Federal Government requires something less than one-half of the total. It obtains its revenue in part from duties on imports, in part from excise taxes, in part in other ways, and only in part from income taxes. The bald figures that we have mentioned afford a scale in consideration of the subject.

If taxes were paid proportionately, everybody would have to give up about one-eighth of his income. Practically, it is impossible to collect anything directly from a large part of the small incomes, and if that condition cannot be offset by indirect collections, it is necessary to make increased levies on the larger incomes. If the rate be increased in steps according to the scale of income, the system of taxation becomes progressional.

With respect to the bare principles as hereinbefore set forth there is no controversy or dissent. The application of the system of progressional taxation may be removed, however, from the purely fiscal ground and transferred to the social, and that may be carried so far as deliberately to make taxation a leveling process, assessing the rich for the purpose of preventing them from being so, which is, of course, socialistic, and tends even to be communistic.

Why, then, should the radicals in Congress, who represent especially the agrarian States, be in advocacy of a socialistic policy? For the farm-

ers, who are inherently capitalists, are not socialists at all and indignantly repudiate misconceived charges that they are. In answering that question we may touch upon an interesting phase of human psychology.

American labor is not socialistic. It wants capital to earn all that it can, so that itself can get as much out of the proceeds as possible. We can not reasonably find fault with labor for that. We can find fault only when it becomes strangling. That happens probably out of ignorance. We believe that the higher thought among labor leaders is strongly in favor of capitalistic aggregations, on the ground of their superior efficiency and earning capacity; and is against small and inefficient units for the opposite reasons. We do not think that on the part of labor there is any inherent jealousy of the rich. American labor, on the whole, is satisfied with the square deal, and of course ought to have it. If anything different be played up on behalf of labor, it is an exploitation of self-seekers, either political demagogues or would-be plunderers, as it was in Russia.

Now, the position of the farmer is quite different. He is the owner of property, and the last thing in the world to which he would consent is the alienation or nationalization of anything that he owns. The unbalancing of the old equilibrium between property owners and wage earners has affected him acutely. But the woes of the Western farmers are largely of their own making. Thus, a recent economic investigation has shown that a large part of those who have lost their farms in recent years owe their misfortune to over-speculation in land or to speculation in other things, such as oil stocks, in which they had no business.

It is only human nature for the unsuccessful in business to attribute their misfortune to extraneous causes. It is only human nature for them to be envious of those who have been more successful. Under evil leadership they will go further than being merely envious and will become willing to grab property from other owners. In this may be found an explanation of much of the "radicalism" whereof LaFollette and Brookhart are the exponents.

The economic history of Russia since 1917 epitomizes all of this in intense degrees. The relatively small Communist party profited by plunder, but probably not so much as it expected. The great proletariat became destitute and starved to death by millions. The peasants joined with the Communists so long as was necessary for them to increase their own land holdings by robbing the more well-to-do of their land, having accomplished which they ceased from cooperating with the Bolsheviks and thereby wrecked the whole Bolshevik economy. American labor refuses to be beguiled by the Reds for the reason that it does not want to become destitute, but American farmers are willing, out of envy and covetousness, to sanction plans that are equivalent to the confiscation of the property of others, although it be not land.

Probably the American farmer does not realize what he is doing. If there be any class of people who ought to work for the promotion of railroad efficiency, or who ought to advocate reduction of surtaxes to the minimum, or who ought to want to

urge the removal of economic restrictions and restore the old economic equilibrium as soon as possible, it is the American farmer. If he but knew the truth, he is the victim of bad leadership, which, if it could have its own way, would make things very much worse for him.

A CENTRAL WESTERN steel man of the old school (and of the day of pools) once said that the manufacturers of steel might well pray daily to know what was the right price to ask for the product—the price that would tend to its largest use. In an address at Columbus, Ohio, last week, on "The Fallacy of Price Fixing," Vice-President George E. Roberts of the National City Bank of New York well defined the right price of a commodity as "that at which supply and demand meet, so that the market is cleared and demands most effectively satisfied."

NOT only late in 1923, after the earthquake, but ever since the war Japan has been notable in purchases of American wire nails. Of 312,000 tons shipped abroad in the five years since the war Japan has absorbed some 85,895 tons, or 27.5 per cent. This is more than any other nation. Over 72.5 per cent of the total December shipments went to Japan as well as 74 per cent of those in November. Last year, out of over 45,980 gross tons exported, Japan took about 19,450 tons, or over 42 per cent of the total.

## CORRESPONDENCE

### New Process Wrought Iron

*To the Editor:* To illustrate the confusion of ideas as to what may be described as wrought iron in contrast to mild steel, the following incident is of interest.

A bar of 1½ in. round iron, produced by an entirely novel process, was made into links by a firm of chain manufacturers with eminently satisfactory results, showing physical tests as follows: Tensile strength of 51,500 lb. (23 tons) per sq. in.; elongation of 28 per cent and contraction of area of 51 per cent, and subsequently showing an analysis of 99.792 per cent pure iron.

A fracture was then made of the bar revealing a perfect silky fiber without any signs of crystallization—to satisfy the most critical adjudicator as to its standard of wrought iron. The high tensile feature together with the elongation and contraction tests gave the chain maker the conviction that it was a steel bar, although the stubborn fact of the silky fiber contradicted such idea.

To satisfy himself, a piece of the bar was sent to one of the leading metallurgical laboratories, where the professor polished and photographed it and eventually sent his report that the bar consisted of 60 per cent wrought iron and 40 per cent mild steel.

This report was sent on to the makers of the iron with rather a sarcastic remark on the makers' claim as to its nature. The report was denied immediately with emphasis and authority. The chain maker feeling nettled at his judgment being questioned—having bought and used iron for 40 years, then sent another piece of the bar to a celebrated laboratory in a different locality, the professor of which duly reported that the bar was made up of 90 per cent wrought iron and 10 per cent mild steel.

The point in this incident is not only the remarkable difference of opinion between two celebrated metallurgical professors, either of whom would be expected to



make a diagnosis within a decimal point of the other, but chiefly because of the fact that the bar iron in question contained no wrought iron as it is commonly understood, either in puddled or scrap form. Yet it furnishes an example of wrought iron which for purity of iron by analysis, physical tests, and in fibrous appearance could not be excelled by the highest grade of wrought iron extant, although it appears that its cost of production is well below the cost of ordinary wrought iron bars made from puddled bar or a mixture of iron scrap.

The new process referred to produces the highest grade wrought iron without the aid of forge and puddled iron or wrought iron scrap; more concerning which will be heard of no doubt in the near future.

J. H. MORGAN

J. H. Morgan, Ltd., London, England.

### The Three-Shift Day and Workmen's Compensation

*To the Editor:* I have been very much interested in reading the editorial in the Jan. 17 number of THE IRON AGE, entitled "Unexpected Results of Three

Shifts," and particularly in the suggestion of the writer that the Industrial Commission of Ohio might see their way clear to adjust the workmen's compensation law to fit the eight-hour shift. That would be a very nice arrangement, but it doesn't seem very feasible.

As the amount of compensation paid to an injured workman is a certain percentage of his total wages and has nothing to do with the number of hours that he works, it is difficult to see how the premium for the insurance could be based upon anything but the total wages. When an attempt is made to go into the number of hours that a man works, the problem gets very complicated. I can't feel that there is going to be any relief in that situation, and consequently Mr. Sweetser seems to be correct in his position that a change from ten hours to eight hours with the same total pay increases the payroll 25 per cent, increases the premiums for compensation insurance in exactly the same amount, and is one more added cost to the eight-hour shift.

RALPH McCARTY.

Secretary Corrugated Bar Co., Inc.

Buffalo, Feb. 5.

## President Wilson Grateful to Steel Makers

### Robert S. Brookings Tells of Relations with the White House During the Great War—Harmonious Action Without Law

WASHINGTON, Feb. 11—Robert S. Brookings, chairman of the Price Fixing Committee of the War Industries Board during the Great War, was very closely associated with the late President Wilson throughout that period. Mr. Brookings was long a prominent business man of St. Louis and is now president of the Institute of Economics, Washington. When asked to give his estimate of the service of the War President, particularly as related to connection with the iron and steel industry, Mr. Brookings said:

"I take great pleasure in acceding to your request that I express in a few words the appreciation of our late War President, Woodrow Wilson, for the services rendered the country by the steel industries during the war.

"As chairman of the Price Fixing Committee during the war, I was in almost daily contact with the President who, because of the importance of steel and steel products to the successful carrying on of the war, would sometimes send for me to discuss steel values. The clearness with which his alert mind grasped such an important business problem was almost uncanny, considering his utter lack of business training.

"As the Great War was primarily an industrial problem, and as steel entered not only directly into arms and ammunition but into machine tools and all other processes of production, steel was the keystone of our industrial problems.

"There was no law or special act of Congress authorizing the Price Fixing Committee to fix prices for the civic as well as the war needs of the country. The committee functioned solely as the personal representative of the President who, as Commander-in-Chief of the Army and Navy, with the nation at war, was practically compelled to assume dictatorial powers.

"The Price Fixing Committee, with myself as chairman, and the Steel War Service Committee, with Judge Gary as chairman, met every 90 days for the purpose of fixing prices for a 90-day period. As each of the numerous industrial war service committees with which the Price Fixing Committee had to deal represented a large number of producers, it was our custom to sometimes supplement the price agreements by a Presidential proclamation enumerating the prices and requesting their strict observance by all

producers. As our dealings involved thousands of producers, public sentiment was such that I cannot recall ever having heard of a single violation of these agreements. On several occasions the President expressed to me his appreciation of the patriotic attitude in which the steel industry met the vitally important needs of the Government.

"In conclusion, I am glad of the opportunity to add my modest testimony as to the monumental service rendered the nation by our War President. His never-failing industry and courage coupled with his rare intelligence and high ideals form a combination which cannot fail to find its high place in history."

### The Iron Age and Its Readers

ALONG with its contemporary business journals, THE IRON AGE takes pleasure in a statement from Washington that War Department officials are enthusiastic in their assertions that the success of the campaign of liquidating war materials is due to newspaper and business paper advertising. In five years' time materials costing the Government nearly three billion dollars were disposed of at a cost of \$1,400,000 for advertising space, booklets, engravings and art work, or a selling cost of 1/2 per cent. "With the exception of the auctioneers who have cried many of the sales," says the report, "advertising is the only salesman that has been employed by the Government."

Incidentally it is of interest to all who have felt or feared the effect of the Government's selling that "Every effort will be made to clean up the remaining war surplus property before the close of the fiscal year, which ends June 30." As before, the business papers will undoubtedly continue to advise the officials on market values and conditions, thus serving not only for producing greater revenue for the Government but for sparing the general business of the country from unintelligent competition.

# Iron and Steel Markets

## EXPANDING OPERATIONS

### Bookings Close to January Rate

#### Price Concessions Still Obtain—Second Quarter Sheet Buying—Good Railroad Car Orders

February so far shows expanding operations; in the districts west of Chicago this is a response to increased volume of buying, but in Pittsburgh bookings do not average up to the January rate.

Steel ingot output in January, averaging 133,331 tons per day, is 19,580 tons per day more than the December production. It is regarded as unlikely that of this 5000 tons could have gone into stocks of sheet bars and slabs for later demand, so that shipments were fully one-eighth better than in December. However, steel making operations were cut sharply in December, but are now probably 5 per cent above the rate of the production for all of 1923.

Demand for soft steel bars, by far the largest item in point of steel tonnage, is heavier than for any other rolled product. Some mills are booked for four to six weeks and in the Chicago district the East is finding it possible to sell some sizes.

The Jones & Laughlin Steel Corporation has 11 of its 12 blast furnaces in operation, the Youngstown Sheet & Tube Co. has all nine of its stacks in blast, and the Shenango Furnace Co. is about to start its No. 3 furnace. Another Gary stack is expected to go in within a week.

Price concessions in steel have not by any means disappeared. Some are traceable to extensions on old contracts of 1923, including structural steel. Others are uncovered in tie plates, track spikes, light rails and rivets. Pittsburgh mills are not now altogether ignoring Central Western and Eastern plate prices in competitive territories. In bolts and nuts some business has been taken at the recent 5 per cent advance, but old discounts are still ruling.

Automobile body sheet contracts have been made for the second quarter at current prices, and consumption is keeping pace with production. Sheets are generally firmer, although 3.75c., Pittsburgh, for black, and 4.90c. for galvanized sheets are still encountered.

Price shading in alloy steels seems inconsequential, most mill order books being well filled.

Buying of 30,000 tons of basic by one company and 6000 tons by another in the Philadelphia district, with satisfactory orders for foundry grades, has strengthened the pig iron market in eastern Pennsylvania, and the demand is fairly active in nearly all centers. While prices are for the most part well maintained, Buffalo sellers are

very aggressive and iron is being shipped from that district as far as Indianapolis and Iowa at rather low prices. The possibility of importing foreign iron is having a tendency to check the upward trend of prices in the East.

Little forward buying has developed in wire products, except among jobbers, who are looking for higher prices. Scarcity in wire rods is reported, and one mill is cancelling unspecified tonnages.

With 4000 all-steel hopper cars for the Norfolk & Western Railroad, requiring 50,000 tons of steel, and 2000 box cars for the Santa Fe, miscellaneous small orders make the week's total 6095. In track equipment the Missouri Pacific has bought 16,000 tons of tie plates.

Reduced structural activity is indicated by reports of lettings and inquiries. Contracts awarded call for about 20,000 tons of steel, and new projects for nearly as much.

Great expectations in plates, shapes and bars for Japan are attached to the floating of the loan to that country. From Manila a 1300-ton structural steel inquiry has been received.

Active efforts are being made to import European pig iron and also steel on the Atlantic Coast. A \$6.50 differential in billets was not sufficient to attract buyers.

Finished steel is unchanged in price, THE IRON AGE composite price remaining at 2.789c. per lb., compared with 2.596c. one year ago.

Pig iron has advanced slightly, THE IRON AGE composite price being \$22.86, compared with \$22.77 last week and \$26.96 one year ago.

## Pittsburgh

### Steel Plant Operations Increasing—Some Products Not So Active

PITTSBURGH, Feb. 12.—Continued expansion in steel plant operations still features the situation locally. Ingot capacity in the Youngstown district is as fully engaged as is physically possible and the average in the Pittsburgh district proper now is very close to 90 per cent, with the leading local independents running 90 per cent and the Carnegie Steel Co. 91 per cent. The question now is whether this pace can long be maintained. It has been the experience with several companies that the first full week of the new month has not shown up as well in the matter of new bookings as the two preceding weeks, the falling away being particularly noticeable in the heavy tonnage products.

Railroad car and locomotive buying has not increased as it was expected to by this time, and there are now suggestions that the automotive industry will not do as well this year as it did last year. Promise



## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics  
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Feb. 12, 1924	Feb. 5, 1924	Jan. 15, 1924	Feb. 13, 1923
No. 2X, Philadelphia†....	<b>\$24.13</b>	\$23.63	\$24.26	\$29.76
No. 2, Valley furnace†....	23.00	23.00	22.50	27.00
No. 2, Southern, Cin'ti†....	26.55	26.55	25.05	28.55
No. 2, Birmingham, Ala.†	22.50	22.50	21.00	24.50
No. 2 foundry, Chicago*	24.50	24.50	24.00	29.50
Basic, del'd, eastern Pa....	<b>22.75</b>	22.50	23.25	28.00
Basic, Valley furnace....	22.00	22.00	21.00	26.00
Valley Bessemer, del. P'gh	25.26	25.26	24.76	29.77
Malleable, Chicago*	24.50	24.50	24.00	29.50
Malleable, Valley .....	23.00	23.00	22.50	27.00
Gray forge, Pittsburgh....	23.76	23.76	23.76	28.27
L. S. charcoal, Chicago....	29.15	29.15	29.15	33.15
Ferromanganese, furnace..	107.50	107.50	109.00	107.50

### Rails, Billets, Etc., Per Gross Ton:

O.-h. rails, heavy, at mill..	\$43.00	\$43.00	\$43.00	\$43.00
Bess. billets, Pittsburgh...	40.00	40.00	40.00	40.00
O.-h. billets, Pittsburgh...	40.00	40.00	40.00	40.00
O.-h. sheet bars, P'gh....	42.50	42.50	42.50	40.00
Forging billets, base, P'gh	45.00	45.00	45.00	45.00
O.-h. billets, Phila.....	45.17	45.17	45.17	45.17
Wire rods, Pittsburgh....	51.00	51.00	51.00	50.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb...	2.30	2.35	2.35	2.20
Light rails at mill.....	2.00	2.00	2.25	2.15

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	2.57	2.57	2.62	2.475
Iron bars, Chicago.....	2.40	2.40	2.40	2.50
Steel bars, Pittsburgh....	2.40	2.40	2.40	2.15
Steel bars, Chicago.....	2.50	2.50	2.50	2.25
Steel bars, New York....	2.74	2.74	2.74	2.44
Tank plates, Pittsburgh...	2.50	2.50	2.50	2.20
Tank plates, Chicago....	2.60	2.60	2.60	2.35
Tank plates, New York...	2.69	2.69	2.74	2.54
Beams, Pittsburgh .....	2.50	2.50	2.50	2.15
Beams, Chicago .....	2.60	2.60	2.60	2.35
Beams, New York .....	2.74	2.74	2.74	2.49
Steel hoops, Pittsburgh...	3.00	3.00	3.00	2.90

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire,	Feb. 12, 1924	Feb. 5, 1924	Jan. 15, 1924	Feb. 13, 1923
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.85	3.85	3.85	3.50
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.60
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.65
Wire nails, Pittsburgh....	3.00	3.00	3.00	2.30
Plain wire, Pittsburgh....	2.75	2.75	2.75	2.65
Barbed wire, galv., P'gh..	3.80	3.80	3.80	3.55
Tin plate, 100-lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$4.75

### Old Material, Per Gross Ton:

Carwheels, Chicago .....	\$21.00	\$20.50	\$20.50	\$27.00
Carwheels, Philadelphia...	21.00	21.00	20.00	25.00
Heavy steel scrap, P'gh...	22.00	22.00	21.50	23.00
Heavy steel scrap, Phila...	19.00	19.00	18.00	20.00
Heavy steel scrap, Ch'go...	18.00	18.00	17.00	19.75
No. 1 cast, Pittsburgh....	21.50	21.50	21.00	25.00
No. 1 cast, Philadelphia...	21.00	21.00	20.50	24.00
No. 1 cast, Ch'go (net ton)	21.00	21.00	20.50	23.00
No. 1 RR. wrot, Phila....	22.00	22.00	21.50	25.00
No. 1 RR. wrot, Ch'go (net)	<b>15.50</b>	15.00	15.00	18.00

### Coke, Connellsville,

Per Net Ton at Oven:

Furnace coke, prompt....	\$4.00	\$4.00	\$4.00	\$7.00
Foundry coke, prompt....	4.75	4.75	4.75	8.50

### Metals,

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.75	12.75	12.75	15.25
Electrolytic copper, refinery	<b>12.50</b>	12.37½	12.25	14.87½
Zinc, St. Louis.....	<b>6.72½</b>	6.65	6.35	7.05
Zinc, New York.....	<b>7.07½</b>	7.00	6.70	7.40
Lead, St. Louis.....	<b>8.85</b>	8.40	8.00	8.10
Lead, New York.....	<b>8.90</b>	8.65	8.25	8.10
Tin (Straits), New York..	<b>52.00</b>	51.00	49.50	41.25
Antimony (Asiatic), N. Y.	10.50	10.50	10.00	7.12½

### Composite Price, Feb. 11, 1924, Finished Steel, 2.789c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Feb. 5, 1924,	2.780c.
Jan. 15, 1924,	2.789c.
Feb. 13, 1923,	2.596c.
10-year pre-war average,	1.689c.

### Composite Price Feb. 11, 1924, Pig Iron, \$22.86 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Feb. 5, 1924,	\$22.77
Jan. 15, 1924,	22.04
Feb. 13, 1923,	26.96
10-year pre-war average,	15.72

of a busy year in construction still is regarded as bright, while the demand for pipe is on a rising scale and the story for the first half of this year in tin plate already has been written. Incidentally, there is little likelihood of higher prices for tin plate before July 1 because the leading producers as well as several of the independents wrote contracts for the first six months of this year at \$5.50 per base box Pittsburgh.

Business in wire products gradually is gaining momentum, but new business in sheets and some of the other lighter products, notably strips, leaves room for improvement. On cold-rolled strips the market no longer is above 4.75c. base, Pittsburgh, except on lots of retail proportions. Plates are weaker to the extent that some local mills are equalizing freight in competitive territory with those having an advantage in that direction. There is still some shading of regular

market prices on sheets and while only a small tonnage is represented by the mills which are cutting prices, it is pretty well established that incoming business is less than shipments with most makers.

The rivet market still is weak, particularly in large lots. In other directions quoted prices are well adhered to, although the impression finds some support that not a little of the business now on mill books was entered at less than today's prices. It is believed that low bids being made on fabricated steel find their explanation in the extension of unspecified low-priced tonnage. There had been considerable extending of old contracts for wire products.

Pig iron trading has quieted down considerably following last week's big sales, and this condition makes it rather difficult for producers to obtain the higher prices they now are seeking. A Buffalo producer is

offering foundry iron for second quarter at \$22, base, and this makes it hard for Valley furnaces to get \$24, since the difference in price exceeds the difference in freight in favor of the Valley furnace. The Jones & Laughlin Steel Corporation has put on its Soho furnace since a week ago, now having 10 furnaces on pig iron and one on ferromanganese out of a total of 12 stacks. The Youngstown Sheet & Tube Co. has all nine of its furnaces in blast and the Shenango Furnace Co. is about to start its No. 3 furnace. Outside of the fair-sized purchase of heavy melting steel by a nearby steel maker, the scrap market has been dull and while one interest which has not been a buyer for several months has raised its embargo on scrap shipments, others are setting them up. The scrap market here derives most of its strength from other markets. An effort to boost coke prices does not seem to be meeting with success.

**Pig Iron.**—Although higher prices are being sought on practically all grades of pig iron, the advances are not being obtained readily because the demand is moderate and there still appears to be an excess of supply over demand. Valley furnaces are all quoting No. 2 foundry at \$24, furnace, and have succeeded in getting a fair amount of second quarter business in small lots at that price, but in a number of instances the low price at Buffalo has forced a quotation of \$23.50, Valley furnace, and the Bethlehem Steel Co., with the same freight rate into Pittsburgh as the Valley furnaces, still is taking prompt business at \$23.

Other western Pennsylvania furnaces also are naming lower delivered Pittsburgh prices than the Valley furnaces. The Westinghouse Electric & Mfg. Co. is in the market for 2500 tons of No. 1, No. 2 and No. 2X iron for its Cleveland plant and 1500 tons of No. 2 for its Trafford, Pa., plant. This is the only sizable inquiry now before the market. The effort is being made to secure \$24 Valley furnace for Bessemer iron, but practically all of the large consumers of this grade covered their immediate requirements at \$23, and \$23.50 is as high as any recent sales of importance have been made. Basic grade is generally held at \$23, but several makers expressed a willingness to take \$22.50 and in the absence of sales we continue to quote the market from \$22 to \$23. The most recent sales of this grade of any consequence were at \$22 and it is not yet a certainty that some makers would not go to that price on a desirable piece of business.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic .....	\$22.00 to \$23.00
Bessemer .....	23.00 to 24.00
Gray forge .....	22.50 to 23.00
No. 2 foundry .....	23.00 to 24.00
No. 3 foundry .....	22.50 to 23.00
Malleable .....	23.00
Low phosphorus, copper free....	29.00 to 30.00

**Ferroalloys.**—While the leading domestic producer of ferromanganese now is quoting \$107.50, furnace, this interest for a brief period had a price as low as \$106.50, at which a considerable amount of business was entered. This included not only some business that was pending at the time the British producers went to \$107.50, c.i.f. Atlantic seaboard, duty paid, but also tonnage that allowed consumers to average down the cost of their material to about the new base. Business lately has been rather dull, with buyers inclined to hold back pending a clarification of the price situation. Activity also is absent in the other ferroalloys, prices of which are holding at recent levels. Prices are given on page 541.

**Semi-Finished Steel.**—Steel makers serving the automotive industry having covered their most pressing requirements, the market has lapsed back into comparative dullness. Only small tonnages now are sought and as far as this and nearby districts are concerned, such demands have been easily met. There is no occasion to change prices, but it would be some exaggeration to describe the market as strong, because steel production is only slightly less than at the peak point of 1923, and judged by the first week, this month is

not going to be as good as January in the matter of orders for finished material. It is fairly general testimony that the past week has seen some slowing down in buying of finished products and the desire of the makers of a number of products for orders is seen in a softer tendency of prices. We still regard \$40 as the market on billets and slabs, and most makers still are holding sheet bars at \$42.50, although the most recent sale of any importance was at \$41, Youngstown. Sales of forging billets are practically impossible at higher than \$45, although some makers, not anxious for such business, are asking \$47.50. An inquiry of any considerable size for skelp probably would bring out a price of 2.30c. and possibly less; the test, however, is lacking. The rod market still is slow, although some makers report a fair number of small orders. No shading of the regular price of \$51, base, for rods is noted. Prices are given on page 541.

**Wire Products.**—While orders show a steady expansion and mill obligations are increasing, there is no such activity as featured the market at this time last year. Then the mills generally were cancelling unspecified orders, while now the more common tendency is to extend them. Not a little of the business now on mill books is that which buyers failed to specify against in the latter part of last year. While there are some jobbers who expect higher prices when the spring demand begins to be felt, and accordingly are anticipating their requirements, the more common attitude of consumers and distributors is that nothing is to be gained by buying ahead, so long as the mills are making prompt deliveries and the railroads are functioning as well as they are at present. Present operations of the mills are from 75 to 85 per cent, but current business does not warrant those rates, and it is believed there is some stocking by the mills. Mill prices in the main are fairly firm, but weakness continues in the secondary market. Prices are given on page 540.

**Steel Rails.**—Light rails still are dull and weak. There are more sellers than buyers and with competition for orders, particularly for those of fair size, very keen, the market is largely a buyers' affair. Only retail quantities can be sold as high as 2.15c., base, with 2c., base, the prevailing maximum on lots of a carload or more.

We quote light rails rolled from billets at 2c. to 2.15c. base (25-lb. to 45-lb.); rerolled rails, 1.85c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

**Iron and Steel Bars.**—There are good specifications from makers of cold-finished steel bars, but other consumers, notably the producers of bolts, nuts and rivets, are not experiencing satisfactory markets and are conservative in their shipping instructions and purchases. Most mills accumulated a good backlog of bar orders in December and the fore part of last month, but it is doubtful whether accretions since have been as large as shipments. All mills in this territory are quoting 2.40c., base, Pittsburgh, but there is much tonnage now in process that was entered \$2 to \$3 per ton less. Shipments against new business still are normally prompt. Iron bars are in fair demand only, but prices are holding fairly firm.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more, f.o.b. Pittsburgh.

**Plates.**—Local plate-making unit of the Steel Corporation is well supplied with business, and mill operations are high; with the independents the story is just the reverse. Generally, activity in plates is less than in the other heavy tonnage products, and that is not surprising in view of the light order books of nearby plate-consuming industries. Although the common quotation here is 2.50c., base, Pittsburgh, it is doubtful whether there is as general a tendency by local mills to ignore lower prices by Central Western and Eastern mills as there was recently. Freight differences are being absorbed in competitive territory by mills in this district, and in some instances that means a price as low as 2.40c., Pittsburgh. About 1000 tons of plates will be required for six or eight barges, bids for which have been asked by Feb. 23, by the U. S. Engineers, Louisville office. Prices are given on page 540.



**Structural Material.**—Mills here have given protections against a large amount of tonnage, but it is a fairly general condition that not many actual orders yet have dropped. The principal outlet is to fabricating shops which are building up their stocks. About 4000 tons of structural shapes will be required for the new transformer buildings which the Westinghouse Electric & Mfg. Co. is to build at Sharon, Pa. In this district, there is pretty close observance of the regular prices of 2.50c. for large structural beams. Prices are given on page 540.

**Cold-Finished Steel Bars and Shafting.**—Prices are well maintained notwithstanding that demand could be better. In a few cases makers note an excess of orders over shipments, but the more common experience is that salesmanship is very necessary to good bookings at present. The common tendency of consumers is to order in close accordance with requirements, since there is little thought of higher prices right away and delivery service rarely has been as good at this time of year as it is at present. We continue to quote the market at 3c., base, Pittsburgh, with freight equalized with Chicago into competitive territory. Ground shafting still is priced at 3.40c., base, f.o.b. mill, for lots of a carload or more.

**Hot-Rolled Flats.**—While prices of these products are fairly well maintained, due to the fact that most makers still have a fairly good backlog of orders, deviations from the regular base of 3c., Pittsburgh, are somewhat more frequent than recently. Some mills need orders in hoops and bands, and others could take on more strip business. This condition is bringing out concessions of \$2 to \$3 per ton, but does not appear to be developing much business, as buyers generally are covered as far ahead as they care to be at this time and in view of absence of shipping hindrances. Prices are given on page 540.

**Cold-Rolled Strips.**—Accretions to the backlog tonnages booked during December, generally at 4.75c., base, Pittsburgh, have not been great enough to enable makers to maintain economical mill operations, and the quotation of 5c., base, established following the December bookings has begun to disappear. Several makers are quoting 4.75c. and others, although naming 5c., are meeting the lower price rather than lose customers.

**Bolts, Nuts and Rivets.**—While the recent advance in bolts and nuts has stimulated specifications against contracts to some extent, the market can hardly be called active, and the new quotations are an ornament rather than a sales basis. Large lots of rivets still are selling at low prices, due to the excess of capacity over current requirements and sharp competition for desirable business. Prices and discounts are given on page 540.

**Track Supplies.**—Current demand for spikes is very moderate, particularly for the smaller sizes, and makers steadily are reducing their backlogs. There is fair observance of quoted prices, but there is too little demand to provide a real test of the market. Local makers do not expect to share in the distribution of 4000 tons of tie plates recently inquired for by the Nickel Plate system. Prices are given on page 540.

**Tubular Goods.**—Demand for pipe still is expanding as jobbers line up their stocks against future demands. There has been a notable gain lately in the demand from jobbers serving the oil-producing districts, and some producers have reached the point in their production schedule where they are beginning to find it necessary to warn their customers about overspecifying. There is practically full engagement of pipe-making capacity in this and nearby districts, and prices are firm except on line pipe, which, as usual when there is some idle capacity, is being shaded. The Central Natural Gas Co. of Kentucky is in the market for 18 miles of 7-in. plain end line pipe. Boiler tubes still are inactive and prices are irregular and easy. Discounts are given on page 540.

**Sheets.**—New features are lacking except that the American Sheet & Tin Plate Co., as a result of excess of orders over shipment last month, has put on a few mills and now is operating at slightly above 75 per cent of capacity. As a general rule buyers covered their

requirements over the first three months of this year last December, and are not very free buyers at present. A few mills still are selling at less than the regular prices and buyers also are encouraged to pursue a conservative policy by the lack of signs of an early advance. Prices are given on page 540.

**Tin Plate.**—There is free specifying against contracts and all of the leading producers in this and nearby districts are able to maintain practically full operations. Although the price of \$5.50 per base box as announced last November by the American Sheet & Tin Plate Co. was to have been for the first quarter of this year only, that interest took contracts for the first half of this year at that price and several of the independents did likewise. Hence the price has been virtually established for the first half instead of the first quarter of the year. The price of pig tin has gone up pretty sharply in the past few weeks, but it is doubtful whether many of the tin plate manufacturers lack supplies.

**Coke and Coal.**—Coke prices are the same as they were a week ago, despite a fairly general tendency on the part of producers to obtain more money. A number of producers are asking \$4.50 to \$4.75 for second quarter tonnages of furnace coke, but business of this sort done so far has been at \$4.25, the Bethlehem Steel Co. being a recent purchaser of 15,000 tons a month at that price. Spot furnace coke holds at \$4 on the bulk of the business, with occasional sales 10c. to 15c. a ton higher. Spot foundry coke still ranges from \$4.75 to \$5.50, while second quarter contracts range from \$5.50 to \$6.50. Activity is lacking in coal, and prices are holding at about recent levels, with mine run steam coal quotable from \$1.60 to \$2 per net ton at mine, coke and coal, \$1.75 to \$2.15, and gas coal, \$2.25 to \$2.50.

**Old Material.**—Little change has taken place in prices since a week ago. Mills are not enough interested in supplies to raise their bids, but there is sufficient demand to sustain recent quotations. One steel manufacturer or another seems to come into the market in time to prevent a decline. Dealers lately have been pretty uneasy over the failure of the mills to come into the market, but have feared going short of the market in the face of continued strength in other consuming centers and the high prices paid for the Pennsylvania Railroad scrap. A local mill recently bought about 10,000 tons of heavy melting steel, paying \$22 delivered for the bulk of it, but \$22.50 for about 1000 tons, which was from the plant of a maker of track supplies and was very desirable material and really worth the extra price. Norfolk & Western Railway will receive bids until noon, Feb. 13, on 9755 gross tons of scrap.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$22.00
No. 1 cast, cupola size.....	\$21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa. ....	23.00 to 23.50
Compressed sheet steel.....	19.50 to 20.00
Bundled sheets, sides and ends..	18.00 to 18.50
Railroad knuckles and couplers..	23.50 to 24.00
Railroad coil and leaf springs...	23.50 to 24.00
Low phosphorus blooms and billet ends.....	25.50 to 26.00
Low phosphorus plate and other material .....	24.50 to 25.00
Railroad malleable .....	19.50 to 20.00
Steel car axles.....	23.50 to 24.00
Cast iron wheels.....	20.00 to 20.50
Rolled steel wheels.....	23.00 to 24.00
Machine shop turnings.....	16.50 to 17.25
Sheet bar crops.....	23.00 to 24.00
Heavy steel axle turnings.....	19.00 to 20.00
Short shoveling turnings.....	17.50 to 18.00
Heavy breakable cast.....	20.00 to 21.00
Stove plate .....	16.00 to 17.00
Cast iron borings.....	17.50 to 18.00
No. 1 railroad wrought.....	17.00 to 17.50
No. 2 railroad wrought.....	22.00

The Interstate Commerce Commission has suspended until June 4, operations of schedules intended to restrict the existing rate of 34c. per gross ton on pig iron in carloads between Florence and Sheffield, Ala., so that the rate would not apply to traffic for movement by way of water to points beyond. The proposed change would result in the application of a rate of 45c. per net ton.

## Chicago

### Heavy Booking of Rails and Bars—Active Inquiry for Shapes

CHICAGO, ILL., Feb. 12.—Bookings of a leading local mill last week were the heaviest in six months, while inquiries were the largest since the early part of December. Part of the tonnage taken was a large quantity of rails recently ordered by a local road, as previously announced in our columns, while the next commodity in order of importance was bars. Orders for billets for both forging and rolling purposes have also been liberal. Commitments in the heavier rolled products greatly exceed shipments; in fact, one important local mill has booked twice as much as it has shipped during the past eight weeks.

Demand for structural shapes has been notably heavy, from both domestic and foreign sources. The probable consummation of a Japanese loan this week will release orders for plates, shapes and bars which are expected to reach 1,000,000 tons. Shading in sheet prices appears to have disappeared and plates, shapes and bars remain firm. Concessions, however, have been made in tie plates, track spikes and bolts and light rails. Local furnace and mill operations are unchanged, but the Illinois Steel Co. plans to add another furnace at Gary by the end of this week or the beginning of next. This will give it 23 active stacks out of 27 steel works blast furnaces.

**Pig Iron.**—The market is quiet, with local and Southern prices firm. In fact, Southern foundry has advanced to a minimum of \$23 base, Birmingham, and one furnace is quoting \$24. Little Southern iron is penetrating into Chicago territory, although we note one sale of 100 tons at \$23.50 base, Birmingham. Soo iron, on the other hand, has been sold as far south as northern Indiana and a good-sized order for Buffalo iron was placed at Indianapolis at a delivered price which figures back to less than the going Chicago price. Two carlot sales of Buffalo iron have been made for all-rail shipment to Iowa destinations, the freight amounting to approximately \$6.70. Local producers continue to reduce their stocks on furnace yards, but they have no definite plans for adding to their present active capacity. A local melter is inquiring for 300 tons of low phosphorus, while a down-State plant is in the market for 500 tons of malleable. An Illinois malleable foundry has purchased 200 tons of charcoal for prompt shipment. Two carload sales of silvery for local delivery have been made at the new Jackson County schedule.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumer's yard or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago..	\$29.15
Northern coke, No. 1, sil. 2.25 to 2.75 .....	25.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25 .....	24.50
Malleable, not over 2.25 sil. ....	24.50
Basic .....	24.50
High phosphorus .....	24.50
Southern No. 2 .....	\$29.01 to 29.51
Low phos., sil. 1 to 2 per cent, copper free .....	33.00 to 34.29
Silvery, sil. 8 per cent. ....	38.29

**Ferroalloys.**—A local user has purchased 300 tons of ferromanganese at \$107.50, f.o.b. New Orleans. An order for 150 tons of foreign spiegeleisen brought out a price of \$37, New Orleans. Domestic material remains unchanged at \$40 Eastern furnace for carloads and \$1 less for quantities.

We quote 80 per cent ferromanganese, \$115.06, delivered; 50 per cent ferrosilicon, \$75, delivered; spiegeleisen, 18 to 22 per cent, domestic, \$47.53 to \$48.58, delivered; foreign, \$44.56, delivered.

**Plates.**—The Santa Fe has ordered 2000 refrigerator cars, involving 14,000 tons of steel, which will be fur-

nished by a local mill. Demand for oil storage tanks is quiescent, but makers of boilers and filling station tanks and casing head tanks for gasoline plants are buying considerable steel.

The mill quotation is 2.60c., Chicago. Jobbers quote 3.30c. for plates out of stock.

**Bars.**—Demand for soft steel bars continues to be heavier than for any other rolled product. Local mills have become so heavily obligated in some sizes that producers east of here are finding it possible to sell small quantities of bars for prompt shipment on an f.o.b. Pittsburgh base. Interest in bar iron is also reviving, no doubt because of the condition of the mild steel bar market, but buying has not progressed far enough to give iron mills much of a backlog. Demand for rail steel bars continues to show gradual improvement.

Mill prices are: Mild steel bars, 2.50c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting is 4c. for rounds and 4.50c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.75c. to 3c. base; hoops, 4.45c.; bands, 3.95c.

**Bolts and Nuts.**—Specifications are holding their own at the rate which obtained in January and December. Automobile manufacturers continue to buy heavily and the farm implement industry is taking increasing quantities of material, but jobbers continue to hold aloof from the market. Some business is being booked at the recent advances of 5 per cent, but the old discounts are still the ruling quotations in this territory.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.95c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 55 and 5 per cent off; larger sizes, 55 and 5 off; carriage bolts up to  $\frac{3}{4}$  x 6 in., 50 and 5 off; larger sizes, 50 and 5 off; hot pressed nuts, squares and hexagons, tapped, \$3.50 off; blank nuts, \$3.50 off; coach or lag screws, gimlet points, square heads, 60 and 5 per cent off.

**Sheets.**—Specifications have been very heavy, particularly from manufacturers of seasonal goods, such as eave troughs and conductor pipe. Inquiry likewise is larger and it is notable that a number of important users who had delayed buying are now hastening to get under cover. At the same time, price concessions appear to have disappeared entirely and the quotations published below are now generally adhered to.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago: 4c. for blue annealed; 4.70c. for black and 5.85c. for galvanized.

**Cast-Iron Pipe.**—Buying is heavy by both municipalities and private users. The increasing demands on makers have been reflected in price advances, the lowest quotation on any size now being \$48, base Birmingham. On sizes under 12-in. a number of manufacturers are asking \$49 to \$50, base Birmingham. Lettings include:

Detroit, 5000 tons of 6 and 8-in. to Lynchburg Foundry Co., and 6100 tons of 6, 8, 12 and 16-in. to United States Cast Iron Pipe & Foundry Co.

Ft. Wayne, Ind., 350 tons to National Cast Iron Pipe Co. and 125 tons to James B. Clow & Sons.

South Bend, Ind., 1400 tons to Lynchburg Foundry Co.

Rock Island, Ill., 150 tons to National Cast Iron Pipe Co.

Quincy, Ill., 300 tons to American Cast Iron Pipe Co.

Fostoria, Ohio, 125 tons to American Cast Iron Pipe Co.

Viroqua, Wis., 100 tons to National Cast Iron Pipe Co.

Bay City, Mich., 300 tons to United States Cast Iron Pipe & Foundry Co.

Various subdivisions in suburbs of Detroit, 1500 tons divided among a number of makers.

Milwaukee Gas Co., Milwaukee, Wis., 12,000 tons of gas pipe to United States Cast Iron Pipe & Foundry Co.

#### Pending work includes:

Chicago, 670 tons, James B. Clow & Sons, low bidder on basis of delivery desired.

South Park Commissioners, Chicago, 800 tons of 2 to 20-in., bids to be in Feb. 13.

Fond du Lac, Wis., 150 tons of 4, 6 and 8-in., Feb. 12.



Duluth, Minn., 1200 tons of 4 and 6-in. gas and water pipe, Feb. 14.

Rochester, Minn., 300 tons, Feb. 14.

Faribault, Minn., 120 tons, Feb. 12.

Pontiac, Mich., 600 tons, Feb. 11.

Rockford, Ill., 350 to 600 tons of 6, 8, 12 and 24-in., Feb. 11.

La Crosse, Wis., 200 tons, bids under advisement.

Lima, Ohio, 700 tons, prospective.

We quote per net ton, f.o.b. Chicago, as follows:  
Water pipe, 4-in., \$60.20 to \$61.20; 6-in. to 10-in., inclusive, \$56.20 to \$57.20; 12-in. and above, \$55.20; class A and gas pipe, \$5 extra.

**Rails and Track Supplies.**—The Missouri Pacific has placed approximately 16,000 tons of tie plates, the distribution being as follows: 600,000 tie plates each to the Inland Steel Co. and the Tennessee Coal, Iron & Railroad Co., 500,000 each to Colorado Fuel & Iron Co. and the Scullin Steel Co., 300,000 to Illinois Steel Co., 500 tons to Sellers Mfg. Co. and 300 tons to the Lundie Engineering Corporation. Competition has been keen on tie plates, track spikes and bolts and ruling prices have been shaded. Demand for light rails show slight improvement, particularly in the South, but prices are being shaded to the extent of \$1 to \$3 a ton.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.10c. mill; track bolts with square nuts, 4.10c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.75c. base, and track bolts, 4.75c. base.

**Structural Material.**—Fabricating awards for the week were few, the largest amounting to 1100 tons required for transmission towers to be erected between South Chicago and Gary. The mills, however, are receiving heavy inquiries for plain material to be applied, no doubt, against recent orders of fabricators. Export demand is also increasing. An inquiry from Manila calls for 1300 tons of structural material and Japanese are expected to come into the market in a broad way following the flotation of loan to finance reconstruction work. Inquiries continue to be received from South America.

The mill quotation on plain material is 2.60c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

**Wire Products.**—Mill bookings are gaining steadily, although jobbers are still deliberate in placing their specifications and are buying in moderate quantities. However, tonnage entered on mill books in January was considerably larger than that for December, and February promises to show a gain over January. Demand from manufacturing users of wire products has been better than from jobbers, but the latter are expected to take an increasing quantity of material as spring approaches. Mill operations average 75 per cent of capacity. Mill prices, which are unchanged, are shown on page 540.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, 3.65c. to 3.80c. per 100 lb.; cement coated nails, 3.10c. to 3.25c. per keg.

**Reinforcing Bars.**—Estimating forces of concrete bar distributors are exceedingly busy figuring on new work, but in the meantime actual awards of tonnage are few. Prices still range from 2.75 to 3c., Chicago warehouse.

Pending work includes:

U. S. War Department, harbor improvements, Milwaukee, Wis., 336 tons of billet or rail steel bars.

Sheridan Trust & Savings Bank building, Chicago, 200 tons, general contract awarded to R. C. Wieboldt Co.

Bell office building, Chicago, 135 tons.

Roosevelt viaduct, for City of Chicago, 115 tons.

Kimball Trust & Savings Bank building, Chicago, 100 tons.

**Old Material.**—The leading independent steel works has bought additional heavy melting at \$18.50 per gross ton delivered, while the Gary mill continues to offer \$18 delivered. Consumer buying is lagging again, but speculative buying by dealers has forced going prices upward on numerous grades. In their opinion, Chicago prices are too low in relation to ruling quo-

tations in centers east of here. A tonnage of heavy melting steel sold by a railroad at Danville, Ill., was shipped to Youngstown at a price which netted the dealer \$2 a ton more than he could have obtained had he shipped to Chicago, a much nearer destination. Railroad offerings include: Santa Fe, 3700 tons; Wabash, 2800 tons; Northern Pacific, 1750 tons; Missouri, Kansas & Texas, 1800 tons; George W. Jennings, Inc., Chicago, 1000 tons; Pullman Co., Chicago, 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	\$21.00 to \$21.50
Cast iron car wheels	21.00 to 21.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Forged steel car wheels	21.50 to 22.00
Railroad tires, charging box size	21.50 to 22.00
Railroad leaf springs, cut apart	21.50 to 22.00
Rails for rerolling	20.00 to 20.50
Steel rails, less than 3 ft.	21.00 to 21.50
Heavy melting steel	18.00 to 18.50
Frogs, switches and guards cut apart	19.00 to 19.50
Shoveling steel	17.75 to 18.25
Drop forge flashings	14.00 to 14.50
Hydraulic compressed sheets	15.25 to 15.75
Axle turnings	16.00 to 16.50
Steel angle bars	20.00 to 20.50
Steel knuckles and couplers	21.50 to 22.00
Coil springs	23.00 to 23.50
Low phos. punchings	19.50 to 20.00
Machine shop turnings	12.00 to 12.50
Cast borings	15.50 to 16.00
Short shoveling turnings	15.50 to 16.00
Railroad malleable	22.00 to 22.50
Agricultural malleable	21.00 to 21.50

Per Net Ton	
Iron angle and splice bars	20.50 to 21.00
Iron arch bars and transoms	20.50 to 21.00
Iron car axles	27.50 to 28.00
Steel car axles	19.50 to 20.00
No. 1 busheling	14.50 to 15.00
No. 2 busheling	10.50 to 11.00
Cut forge	16.50 to 17.00
Pipes and flues	12.00 to 12.50
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	16.50 to 17.00
No. 1 machinery cast	21.00 to 21.50
No. 1 railroad cast	20.00 to 20.50
No. 1 agricultural cast	19.50 to 20.00
Locomotive tires, smooth	18.00 to 18.50
Stove plate	17.00 to 17.50
Grate bars	16.00 to 16.50
Brake shoes	17.50 to 18.00

## New Steel Mills for the American Steel & Tin Plate Co. at Farrell, Pa.

An appropriation has been granted the American Sheet & Tin Plate Co. by the parent organization for the construction of four new sheet mills at its Mercer Works, Farrell, Pa. The new units will bring the total number of mills at this works to 12, but will add more than 50 per cent to the plant's capacity, since the new mills are to be larger than those now in use. This plant is supplied with steel from the Farrell, Pa., works of the Carnegie Steel Co., which also supplies the Farrell Works of the American Steel & Wire Co.

So far as can be learned, the addition to the sheet rolling capacity entails no immediate increase in the steel making capacity at the Farrell Carnegie plant. The Mercer Works is engaged chiefly on special sheets.

## Reduction of Number of Forged Tools Is Recommended

WASHINGTON, Feb. 12.—Recommendations were adopted today at a conference under the auspices of the Division of Simplified Practice, Department of Commerce, to reduce from 549 to 365 the number of types of forged tools. The recommendations follow closely those made by the Forged Tool Society, representing approximately 90 per cent of the forged tool manufacturing capacity of the United States, and affecting the tools of railroad construction workers, miners, road builders, builders, lumbermen, masons, blacksmiths and farmers. The conference was attended by manufacturers, distributors, consumers, representatives of technical societies and officials of the Department of Commerce.

## New York

### Fair Activity in Pig Iron—Some Mills Filled for Four to Six Weeks

NEW YORK, Feb. 12.—While the volume of buying for the week ending today has amounted to only 8000 or 10,000 tons, as compared with 30,000 tons for the preceding week, the market has been fairly active and inquiries for from 20,000 to 25,000 tons are pending. These inquiries come largely from companies dependent upon the building industry and indicate expectation of continued activity in new construction. Prices at Buffalo continue the same, with \$22 furnace for No. 2 plain prevailing, but in eastern Pennsylvania the market is more firm and \$23 seems to be the minimum. Iron from the new blast furnace in Holland is being considered in connection with other foreign irons as a possibility for importing, but there is very little likelihood of a movement of importance from foreign countries. Offers come from England of an iron equivalent to a standard No. 2X foundry at about \$23 per ton, c.i.f. Boston or Philadelphia, but after adding the dealer's profit and average inland freight rates the price for many melters would be so little below that now quoted on domestic iron that the foreign iron does not make a strong appeal.

We quote delivered in the New York district as follows, having added to furnace price \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25.....	\$26.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75.....	25.77
East. Pa. No. 2, sil. 1.75 to 2.25.....	25.27
Buffalo, sil. 1.75 to 2.25.....	26.91
No. 2X Virginia, sil. 2.25 to 2.75.....	30.44
No. 2 Virginia, sil. 1.75 to 2.25.....	31.44

**Ferroalloys.**—Demand for ferromanganese is only moderate. There have been sales of several 100-ton lots and smaller ones at \$107.50 seaboard, most of this being British alloy. There are no large inquiries before the market. Sales of small quantities of foreign spiegel-eisen are noted at a price somewhere equal to the domestic quotation of \$38 to \$40, furnace. Specifications on contract for ferrosilicon and ferrochromium are heavy but no new business is noted.

**Cast-Iron Pipe.**—Prices are firm and there are a fair number of municipal tenders, upon which bids are being submitted. Purchasing by private companies is large and tonnage for spring delivery is rapidly increasing on makers' books. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$61.60 to \$63.60; 4-in. and 5-in., \$66.60 to \$68.60; 3-in., \$76.60 to \$78.60, with \$5 additional for Class A and gas pipe. Discounts in the soil pipe market continue unchanged and there is a fair demand from jobbers, inquiries mostly being for tonnages for spring delivery. We quote discounts of both Southern and Northern makers, as follows: 6-in., 29½ to 30¾ per cent off list; heavy, 39½ to 40¾ per cent off list.

**Finished Iron and Steel.**—Steel buying has improved, broadly speaking; bookings with some producers remain above the recent good rate of shipments, and in some forms of steel orders against the mills have extended to four to six weeks. Now and then one hears of a buyer showing concern that he may have overstayed somewhat, fearing that he will not get deliveries quite as soon as needs may develop. Where pipe stood out a week ago as one form in which supply may not meet the demand, there now may be added wire rods, orders for which are not easy to place. The price situation is firm. At this writing 4000 cars for the Norfolk & Western have been closed.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates, 2.69c. to 2.84c.; structural shapes, 2.74c. to 2.84c.; bar iron, 2.74c.

**Warehouse Business.**—Considering the season, which is generally dull, business is fairly active in most products. Some structural material is still moving and there is a fair demand for sheets, which are slightly firmer. On black and galvanized sheets, however, as

low as 4.50c. per lb. and 5.50c. per lb. base can still be done. Although business during the first fortnight of the present year was extremely slack, activity has been satisfactory since Jan. 15. We quote prices on page 464.

**Coke.**—With furnaces fairly active in purchases of coke, the market on standard furnace is slightly firmer and the \$4 price for prompt shipment is believed to have practically disappeared, while \$4.75 per ton is being done on contracts for second half. Standard furnace coke is quotable at from \$4.25 to \$4.75 per ton, while standard foundry ranges from \$5 to \$5.50 per ton, little being available at the lower quotation. By-product is quoted at \$10.91, Newark and Jersey City, N. J.

**Old Material.**—The market seems to have settled down to a price of \$19 per ton on heavy melting steel, delivered eastern Pennsylvania consumers, with \$18.25 per ton being paid where the freight rate is lower. The advances in price of from 25c. to 50c. per ton being paid by brokers up to last week are no longer in evidence. Stove plate is still quotable here at \$17 per ton delivered to a Harrisburg consumer or \$16.50 per ton delivered to foundries in New Jersey. Specification pipe is firm at \$17.50 to \$17.75 per ton delivered to eastern Pennsylvania. Cast borings are still going forward to Harrisburg at \$16 per ton delivered, while borings and turnings shipped to Bethlehem bring \$15 per ton and to Sparrows Point, Md., \$15.50 per ton. All grades are apparently firm with little or no speculation on a rise in prices.

Buying prices per gross ton New York follow:

Heavy melting steel, yard.....	\$14.50 to \$15.00
Steel rails, short lengths, or equivalent .....	15.50 to 16.00
Rails for rolling.....	18.00 to 19.00
Relaying rails, nominal.....	25.00 to 26.00
Steel car axles.....	18.00 to 19.00
Iron car axles.....	25.00 to 26.00
No. 1 railroad wrought.....	17.50 to 18.00
Forge fire .....	11.50 to 12.50
No. 1 yard wrought, long.....	15.00 to 16.00
Cast borings (clean).....	12.00 to 12.25
Machine-shop turnings .....	12.25 to 12.75
Mixed borings and turnings.....	11.75 to 12.25
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	13.50 to 14.00
Stove plate .....	13.50 to 14.50
Locomotive grate bars.....	15.00 to 15.50
Malleable cast (railroad).....	16.00 to 17.00
Cast iron car wheels.....	16.50 to 17.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$20.00 to \$21.00
No. 1 heavy cast (columns, building materials, etc.), cupola size .....	19.00 to 20.00
No. 1 heavy cast, not cupola size .....	15.50 to 16.50
No. 2 cast (radiators, cast boilers, etc.) .....	17.00 to 18.00

## St. Louis

### Pig Iron Market Dull—Missouri Pacific Railway Buys Tie Plates

ST. LOUIS, Feb. 12.—The pig iron market is in the grip of another dull period. There has been very little buying within the last few weeks, and there is none of consequence in sight. Sales during the last week were less than 1000 tons. Melters are now well covered in their requirements for the first quarter, and buyers have resumed a "watchful waiting" policy in regard to their needs for second quarter; watching for pig iron prices to decline and waiting for more orders on their books, before placing any more raw material business. The stove foundries in the St. Louis and Belleville districts are now in full operation, although several plants were late in resuming after the inventory-taking period. The market is firm, with Northern iron quoted at \$24 to \$24.50, Chicago, and Southern at \$23 to \$24, Birmingham, and the St. Louis Coke & Iron Co., \$25.50 to \$26, Granite City. The Granite City maker sold 350 tons of malleable to an East Side melter. One Texas melter bought 200 tons of charcoal iron and another 100 tons of foundry, while a Southern Missouri melter bought 125 tons of charcoal iron. An



Illinois melter wants 2000 to 3000 tons of foundry, a Tennessee melter wants 100 to 200 tons of basic, and there are other inquiries for carloads up to 100 tons, amounting to 250 tons.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.16 freight from Chicago, \$3.28 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and \$1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25...	\$26.16 to \$26.66
Northern malleable, sil. 1.75 to 2.25	26.16 to 26.66
Basic .....	26.16 to 26.66
Southern fdy., sil. 1.75 to 2.25 (rail)	28.17 to 29.17

**Finished Iron and Steel.**—Chief interest centered this week in the tie-plate order of the Missouri Pacific Railway. The 16,000 tons was allocated to the Illinois Steel Co., Inland Steel Co., Tennessee Coal & Iron Co., Sellers Mfg. Co., Colorado Fuel & Iron Co., Lundie Engineering Co., and Scullin Steel Co. The Pennsylvania System, Southwestern Region, is in the market also for an undetermined quantity of tie plates and track bolts. Fabricators are busy, but are looking for orders, which are scarce. Little business is coming from warehouses and manufacturers of steel products. The contracts for 100 tons of reinforcing bars for the Mendenhall Motor Car Co. building and 60 tons for the Green foundry went to the Laclede Steel Co. An inquiry is out for 850 tons of reinforcing bars for the Missouri-Kansas-Texas Railroad warehouse at Dallas, Tex.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold-rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 4.70c.; structural rivets, 4.15c.; boiler rivets, 4.35c.; tank rivets,  $\frac{3}{4}$ -in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, squares or hexagon blank, \$2.50, and tapped, \$2.50 off list.

**Coke.**—A little better demand for domestic grades is reported by producers but piles in yards are still very high, and it is likely that considerable tonnage will be carried over. Users of foundry grades seem to be well covered in their first quarter requirements, and hardly any interest is being shown in second quarter needs. Connellsville grades are selling at prices ranging from \$5.50 to \$6.75.

**Old Material.**—A dealers' market controls the old material situation. Consumers in this industrial district are buying only from hand to mouth, making the plea that their order files do not justify any extensive purchases. Dealers seem to feel that the business is there or in prospect, and they are taking all railroad lists at high prices. The position of the dealers is strengthened by the fact that the shipments of railroads against contracts with dealers are far behind, and that the supply is not so great now as the railroad offerings would indicate. New railroad lists closing this week follow: Southern Railway, 10,000 tons; Norfolk & Western, 10,000 tons; Northern Pacific, 1500 tons; Missouri-Kansas-Texas, 1800 tons. The market is firm, with prices unchanged.

#### Per Gross Ton

Iron rails .....	\$18.00 to \$18.50
Rails for rolling .....	19.50 to 20.00
Steel rails, less than 3 ft. ....	20.00 to 20.50
Relaying rails, 60 lb. and under ..	25.00 to 26.00
Relaying rails, 70 and over .....	32.50 to 33.50
Cast iron car wheels .....	21.00 to 21.50
Heavy melting steel .....	17.50 to 18.00
Heavy shoveling steel .....	17.00 to 17.50
Frogs, switches and guards cut apart .....	19.00 to 19.50
Railroad springs .....	21.50 to 22.00
Heavy axles and tire turnings ..	14.00 to 14.50

#### Per Net Ton

Steel angle bars .....	16.50 to 17.00
Steel car axles .....	20.50 to 21.00
Iron car axles .....	27.00 to 27.50
Wrought iron bars and transoms ..	22.00 to 22.50
No. 1 railroad wrought .....	16.50 to 17.00
No. 2 railroad wrought .....	16.00 to 16.50
Cast iron borings .....	11.50 to 12.00
No. 1 busheling .....	15.50 to 16.00
No. 1 railroad cast .....	19.50 to 20.00
No. 1 machinery cast .....	19.50 to 20.00
Railroad malleable .....	17.00 to 17.50
Machine shop turnings .....	10.50 to 11.00
Champion bundled sheets .....	10.50 to 11.00

## Buffalo

### Active Demand for Pig Iron with Sales Amounting to About 20,000 Tons

BUFFALO, Feb. 12.—A continuance of the active inquiry of last week is noted, total tonnage sought being about 20,000. All of the companies, with the exception of one which devotes most of its stack capacity to steel-making iron, have taken a part of the business which offered. One furnace placed in the neighborhood of 15,000 tons on its books as its share of the week. Inquiries ranged from carload lots up to one foundry inquiry for 2500 tons and several for 1000 tons each. The price seems to be fairly well sustained at \$22 for second quarter business and \$23 for first quarter. Two of the furnaces have signified that they are not to be reckoned as factors in the first quarter selling. The \$23 price of one maker for first quarter, 1.75 to 2.25 silicon foundry, is described as "absolutely rigid," not only for the base grade, but correspondingly for the higher silicon. Its price for first quarter, 2.25 to 2.75 silicon, foundry is \$23.50, and for first quarter, 2.75 to 3.25 silicon, foundry, \$24.50. The range on second quarter foundry is \$22 to \$23.50. Furnaces believe that the market will stiffen and some have turned down a great deal of first quarter inquiry which it was sought to place at lower than \$23.

We quote f.o.b. gross ton, Buffalo, as follows:

No. 1 foundry, sil. 2.75 to 3.25...	\$23.00 to \$23.50
No. 2 foundry, sil. 2.25 to 2.75...	22.50 to 23.00
No. 2 plain, sil. 1.75 to 2.25.....	22.00 to 22.50
Basic .....	22.00 to 23.00
Malleable .....	22.00 to 23.00
Lake Superior charcoal .....	29.28

**Old Material.**—At the present time none of the large mills is in the market, but two of them, which have not purchased in large quantities lately, are expected to buy within a short time. Dealers are furnishing most of the activity in their efforts to pick up material to satisfy an order which was placed some weeks ago by one of the mills. Shipments are pouring in against this order, but the percentage of rejections is very high. As this mill manufactures a high grade of alloy steel, it is imperative that its scrap material be No. 1 quality. Little material is now being sent out of this district to Valley points, the Valley mills apparently having satisfied their requirements. A fairly good demand exists for malleable and outside points are seeking turnings and borings. A little car wheel business has been placed at \$21. All the old material grades are showing activity with the exception of low phosphorus, which fact is attributable to the low operation of most of the steel castings plants.

We quote f.o.b., gross ton, Buffalo, as follows:

Heavy melting steel .....	\$20.50 to \$21.00
Low phos., 0.04 and under .....	24.00 to 25.00
No. 1 railroad wrought .....	18.00 to 19.00
Car wheels .....	20.50 to 21.00
Machine shop turnings .....	14.00 to 14.50
Cast iron borings .....	14.50 to 15.00
No. 1 busheling .....	18.50 to 19.00
Stove plate .....	18.00 to 18.50
Grate bars .....	17.50 to 18.00
Bundled sheet stampings .....	13.00 to 13.50
Hydraulic compressed .....	17.00 to 18.25
Railroad malleable .....	22.00 to 23.00
No. 1 machinery cast .....	20.00 to 20.50

**Finished Iron and Steel.**—The past week has been notable in the interest attaching to bars, the inquiry and business having been better than for months. Specifications are very encouraging to mills and the number of new orders are a healthy sign. Many of the bar orders have run into several hundred tons. Sheet bar inquiry has also gained, and one local maker is in particularly good shape to make quick shipments. Prospects are favorable for a better sheet-piling business as a feature of the near future in connection with projected structural work. The bar price is firm at 2.40c. Pittsburgh, the shading which was marked some weeks ago having entirely disappeared as the smaller mills obtained their backlogs. Shape business is better and the demand for sheets holds. The Seneca Iron & Steel Co. has 12 of its 14 mills in operation. The Donner Steel Co. has increased its open-hearth operation to eight furnaces. Canadian business is growing, agri-

cultural implement makers having come into the market for their special grades.

We quote warehouse prices Buffalo as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.30c.; galvanized steel sheets, No. 28 gage, 6.10c.; black sheets, No. 28 gage, 5c.; cold rolled round shafting, 4.45c.

## Boston

### Eastern Pennsylvania Pig Iron Tends Upward and Other Irons Are Firmer

BOSTON, Feb. 12.—Early in the week further business in No. 2X eastern Pennsylvania second quarter pig iron at \$23, furnace, \$26.65 delivered, or \$22.50 furnace base, was reported. The furnace making such sales since then has advanced to \$23.25 for No. 2 plain, \$23.75 for No. 2X and \$24.75 for No. 1X, or \$26.90, \$27.40 and \$28.40 delivered, respectively. Other eastern Pennsylvania furnaces are not cutting \$23 furnace base. Buffalo first quarter iron generally is \$23 furnace base and second quarter \$22, but where deliveries run over the first quarter, \$22.25 for No. 2 plain has been accepted, and a compromise price on higher silicons. Alabama sales at \$23 furnace base are reported, an advance of 50c., but in a small way only. Sales for the week include 1100 tons No. 2 plain Buffalo, first and second quarter delivery, in two lots. Other sales involved small tonnages.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama:

East. Penn. sil. 2.25 to 2.75.....	\$27.15 to \$27.40
East. Penn., sil. 1.75 to 2.25.....	26.65 to 26.90
Buffalo, sil. 2.25 to 2.75.....	27.41 to 28.41
Buffalo, sil. 1.75 to 2.25.....	26.91 to 27.91
Virginia, sil. 2.25 to 2.75.....	31.42 to 32.42
Virginia, sil. 1.75 to 2.25.....	30.92 to 31.92
Alabama, sil. 2.25 to 2.75.....	33.10
Alabama, sil. 1.75 to 2.25.....	32.60

**Cast Iron Pipe.**—Bids closed this week on 250 tons of 3-in. and 4-in. pipe in 6-ft. lengths required by Boston. Recent awards include 1100 tons, various sizes, by Pawtucket, R. I., 400 tons of 20-in. by Taunton, Mass., 350 tons 16-in. by Keene, N. H., and 285 tons of 8-in. by Gardner, Me., to the Warren Foundry & Pipe Co.; 150 tons for 1924 requirements by Medford, Mass., to R. D. Wood & Co.; and 500 lengths of 6-in. by West Newton, Mass., to the Donaldson Iron Co. Many towns have signified intentions of placing orders for pipe within the next month or so, or as soon as appropriations are made. Cast iron pipe prices are generally fully maintained on the previously reported schedule. One foundry is reported as sold ahead six months on gas pipe.

**Shapes and Plates.**—Bids are being taken on 250 tons of structural steel required for an office building to be erected by the Providence Gas Co., Providence, R. I.; 100 tons for a manufacturing plant contemplated by the National Can Co., Boston; and on 1200 tons for a theater at Washington and Essex Streets, Boston. Bids close this month on 1700 tons for a local insurance building, and plans are going ahead again for the New Statler Hotel, Boston, requiring at least 5000 tons. The latter tonnage, however, probably will be placed through New York. Bids will be asked shortly on approximately 400 tons for the Waterman Building, Boston, while seven other building projects involving \$16,000,000, all in Boston, are in the making. Thus the structural steel market outlook is more encouraging than it has been before in months. T. A. Gillespie Co., New York, was awarded the Massachusetts pipe line between Weston and Waltham on its bid of \$320,413. About 1600 tons of plates are involved. Otherwise the plate market is quieter at 2.40c., Pittsburgh base. Occasionally 2.35c. is quoted.

**Coke.**—Specifications against first half foundry coke contracts are more frequent, indicating greater activity among some of the foundries. At the same time weather conditions have been more favorable for the movement of crushed coke from ovens. Thus the general fuel

situation has improved. Both the New England Coal & Coke Co. and the Providence Gas Co. quote by-product foundry coke, February shipment, at \$12.50 delivered within New England.

**Old Material.**—Further rejections of heavy melting steel by a Steubenville buyer have unsettled the market for that material, causing an unusually wide range of prices and a temporary cessation of buying by brokers. There is still a fair demand for other materials used by steel mills. Wrought pipe is an exception, the failure of buying to develop as anticipated having knocked prices off about \$1 a ton. Machine shop turnings are in excellent demand, chiefly for eastern Pennsylvania shipment and have advanced. Other turnings and borings are firmer in sympathy. Rails for rerolling are 50c. higher on prospective purchases. The Boston & Albany Railroad has just sold 650 tons of these rails, as well as 200,000 lb. of scrap and 100,000 lb. frogs and switches. There is some call for stove plate, but New England melters show practically no interest in other kinds of scrap.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$22.00 to \$22.50
No. 2 machinery cast.....	20.00 to 20.50
Stove plates .....	15.50 to 16.50
Railroad malleable .....	19.00 to 19.50

The following prices are offered per gross ton lots, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$14.00 to \$15.25
No. 1 railroad wrought.....	14.50 to 15.00
No. 1 yard wrought.....	12.50 to 13.00
Wrought pipe (1-in. in diam., over 2 ft. long).....	12.50 to 13.00
Machine shop turnings .....	11.50 to 12.00
Cast iron borings, chemical.....	12.00 to 12.50
Cast iron borings, rolling mill.....	11.00 to 11.75
Blast furnace borings and turnings.....	11.00 to 11.75
Forged scrap and bundled skeleton.....	10.50 to 11.00
Shafting .....	17.50 to 18.50
Street car axles.....	17.50 to 18.00
Rails for rolling.....	15.50 to 16.00

## Cincinnati

### Moderate Tonnage of Pig Iron Sold—Some Reports of Concessions

CINCINNATI, Feb. 12.—The market quieted down considerably from the previous week, but a fair aggregate tonnage was disposed of, mostly of Northern irons. A central Ohio melter bought 2000 tons of malleable and foundry grades and it is reported that a concession of 50c. from the Ironton price was secured. A Columbus melter is also reported to have placed considerable tonnage at a concession. On the other hand, numerous sales of small tonnages are reported at the full schedule. It is barely possible that \$23.50 can be done in southern Ohio, as some resale iron is available and could possibly be had at that price. Buffalo iron is being quoted freely in this territory on the basis of \$22, Buffalo, and sales are being made on that basis. There is little Southern iron moving and while practically all furnaces are asking \$23 for second quarter, it is still possible to buy for prompt shipment at \$22.50. There is little inquiry, a Cincinnati melter being in the market for 600 tons and several melters in the central part of the State for 200 to 300-ton lots.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base).....	\$26.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	27.05
Ohio silvery, 8 per cent.....	35.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2) .....	26.27
Basic Northern .....	25.77
Malleable .....	25.27

**Sheets.**—Some of the independent mills are booking second quarter business at the prices named for first quarter. The demand for sheets has been good the past week, and while there are reports of price shading, the majority of the business is being placed at the regularly quoted schedule of 3c. for blue annealed, 3.85c. for black, and 5c. for galvanized.

**Structural Activity.**—Several new inquiries, mostly for small tonnages, have appeared. A number of



projects, involving approximately 12,000 tons, will be awarded this week, bids closing on Monday and Tuesday. A power plant for the Union Gas & Electric Co., Cincinnati, involving 5300 tons, will be up for bids shortly. Foundation work on this project was awarded last week.

**Reinforcing Bars.**—The general contract for the foundation work at the new plant of the Union Gas & Electric Co., Cincinnati, has been awarded to the Foundation Co., and it is expected that the reinforcing bars, 1400 tons, will be awarded this week. A number of other inquiries are current, and will likely be awarded this week. Prices are firming up considerably.

**Warehouse Business.**—Local jobbers report business as rather slack, but there is no indication of a slump, as manufacturing activities in this district are showing improvement. Prices are steady.

**Finished Materials.**—Orders, while for small tonnages, are more numerous, and each week shows an improvement over the preceding one. Plates are in fair demand, and structural shapes and bars are also being placed with fair regularity. Wire products are moving better, and orders for spring shipments were fairly heavy last week. A better demand is also reported for bolts and nuts, and prices are firmer. Some fair sized orders for track accessories were placed last week, but light rails were in rather light demand. Prices generally are being maintained, and there has been little deviation from those in effect for the past several months.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.25c.; cold-rolled flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 4.80c.; No. 28 galvanized sheets, 5.85c.; No. 9 annealed wire, \$3.60 per 100 lb.; common wire nails, \$3.50 per keg base; cement coated nails, \$3.30 per keg.

**Coke.**—Foundry grades are in good demand, but furnace and domestic grades are quiet. Some price shading is reported, particularly in the early part of the week, when concessions of 25c. to 50c. per ton are offered for quick shipment.

Connellsville furnace, \$4; foundry, \$5; New River foundry, \$10.50; Wise County furnace, \$4.75; foundry, \$5.50; by-product foundry, \$8, Connellsville basis.

**Old Material.**—Little activity is reported in this district, but several small inquiries are current for outside districts. The markets, generally, are quiet. Prices are inclined to weakness, but in the absence of sufficient trading to establish quotations are quoted nominally the same as last week.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel.....	\$18.00 to \$18.50
Miscellaneous rails.....	17.00 to 17.50
Short rails.....	21.50 to 22.00
Relaying rails.....	31.00 to 31.50
Rails for rolling.....	18.50 to 19.00
Old car wheels.....	16.00 to 16.50
No. 1 locomotive tires.....	18.00 to 18.50
Railroad malleable.....	19.00 to 19.50
Agricultural malleable.....	18.00 to 18.50
Loose sheet clippings.....	13.00 to 13.50
Champion bundled sheets.....	13.50 to 14.00

Per Net Ton	
Cast iron borings.....	12.50 to 13.00
Machine shop turnings.....	11.50 to 12.00
No. 1 machinery cast.....	21.50 to 22.00
No. 1 railroad cast.....	18.00 to 18.50
Iron axles.....	24.00 to 24.50
No. 1 railroad wrought.....	13.50 to 14.00
Pipes and flues.....	11.00 to 11.50
No. 1 busheling.....	12.50 to 13.00
Mixed busheling.....	10.50 to 11.00
Burnt cast.....	13.50 to 14.00
Stove plate.....	14.00 to 14.50
Brake shoes.....	14.50 to 15.00

The McMyler Interstate Co., Bedford, Ohio, has brought out a line of steam shovels which will be made in  $\frac{3}{4}$  and 1 cu. yd. capacity. This company, in addition to manufacturing electric traveling and locomotive cranes and car dumpers, has commenced the manufacture of connecting rods and pistons for locomotives, having installed some special equipment in its forge shop for this purpose.

## Cleveland

### Active Demand for Pig Iron—New Open Hearths Placed in Operation

CLEVELAND, Feb. 11.—The demand for foundry and malleable pig iron is active, the bulk of the business being for the second quarter and some of the large consumers are contracting for that delivery. There is also a fair demand for prompt shipment iron. The market is firm, but the price situation shows virtually no change from a week ago. Lake furnaces are holding to \$24 for foundry and malleable grades. While some producers in the Valley and southern Ohio districts are asking the same price, small lot sales are being made in the Valley district at \$23.50, and it is probable that the \$23 price has not disappeared. Sales for shipment to some competitive points in Ohio are reported to have been made by southern Ohio furnaces at \$23.50. Buffalo furnaces still appear to be seeking business in this State at \$22. A leading agricultural implement manufacturer has purchased 2200 tons of foundry iron for Springfield, Ohio, and 500 tons for its Richmond, Ind., plant. A Columbus melter has taken 1000 tons of malleable iron, this sale being credited to a southern Ohio furnace. The Westinghouse Electric & Mfg. Co. has an inquiry out for 2700 tons of foundry iron for Cleveland and 1500 tons for Trafford City, and two 1000-ton inquiries, one for malleable and the other for foundry iron, are pending from Warren, Ohio. The American Steel Foundries has an inquiry out for 2000 tons of basic iron for its Alliance, Ohio, plant for March and April shipment. One lake furnace during the week sold 10,000 tons of foundry and malleable iron and is now virtually sold up for the second quarter. Low phosphorus iron has become more active. A Valley producer during the week sold 3000 tons, including a 1000-ton lot.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$22.50 to \$23.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	24.50
Southern fdy., sil. 1.75 to 2.25.....	29.00
Malleable.....	24.50
Ohio silvery, 8 per cent.....	36.52
Standard low phos., Valley furnace.....	29.00 to 30.00

**Iron Ore.**—Cold weather caused a slowing down of ore shipments from the Lake Erie docks during January when the dock movement was 452,141 gross tons as compared with 841,790 tons during December and with 767,568 tons during January last year. The balance on docks Feb. 1 was 7,537,539 tons as compared with 8,466,972 tons on Feb. 1 a year ago. All-rail shipments from United States mines in the Lake Superior district last year were 1,745,256 gross tons according to figures prepared by the Lake Superior Iron Ore Association. Canadian mines last year shipped 27,178 tons. Shipments by water were 59,026,092 tons, making the total water and rail shipments from United States mines 60,771,348 tons. With rail shipments from the Canadian mines the grand total was 60,798,526 tons.

**Alloy Steels.**—Some price shading has developed on alloy steels, but most mills are well filled with orders and are holding to the regular price schedules.

**Semi-Finished Steel.**—The Otis Steel Co., which has been a large buyer of semi-finished steel, has placed the four open-hearth furnaces of its new steel plant in operation and expects to start its blooming mill in about two weeks. The market is dull, although some demand has sprung up for forging billets in car lots, which are quoted around \$45. Slabs are available at \$41, although sales have been made at \$42.50.

**Reinforcing Bars.**—Inquiries involving a large tonnage are pending for building and road work. The Bourne-Fuller Co. has taken 110 tons for the Third National Bank Building, Dayton; 120 tons for the Medical Science Building, Columbus, and 100 tons for the Stern & Mann Co. Store Building, Canton. On soft steel reinforcing bars, 2.30c., Pittsburgh, is the common

quotation, but this would probably be shaded when necessary to meet the competition of rail steel bars which are quoted at 2.10c.

**Sheets.**—A local mill has booked some orders for automobile body sheets for the second quarter at the regular 5.35c. price. Specifications from the automotive industry are heavy and some of the mills are not able to make shipments as fast as needed. Blue annealed sheets are firm at 3c., but concessions to 3.75c. on black and to 4.90c. on galvanized sheets are still being made.

**Bolts, Nuts and Rivets.**—Specifications for bolts and nuts have increased, but new demand is light. The market shows firmness although there is scarcely enough business coming out to test prices and determine whether manufacturers generally will stick to the recent advance. Most consumers are under contract at the old prices. Rivet orders have improved, but new business is light. Prices are weak. The common quotation is 2.75c. for large rivets and shipments are being made at that price to consumers having 2.90c. contracts. Small rivets are not above 70 and 10 per cent off list except for very small lots.

**Finished Iron and Steel.**—The volume of business continues good, although orders with some mills are not so heavy as in January. Steel bars in good tonnages are being booked by bolt and nut makers, implement manufacturers and other consumers. Deliveries are getting a little slower. Plates are only moderately active. Some plate mills can take orders for early shipment and the 2.40c. price is still common, although some carlot orders are being booked at 2.50c. The Lima Locomotive Works has an inquiry out for 1600 tons of plates for 33 locomotives which it has taken for the New York Central Railroad. In the structural field new inquiry is rather light. The Bethlehem Steel Co. has taken 1450 tons for a bank and office building in Cleveland. An inquiry is expected shortly for several thousand tons for bridges in connection with the Pennsylvania Railroad grade elimination work in this city. Strip mills are well filled with orders for narrow strip, which is firm at 3c., but wide strip is still to be had at 2.75c. Hoops in light gages or narrow widths are firmer and are quoted at 3.15c. to 3.50c.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 28 black sheets, 4.40c. to 4.65c.; No. 28 galvanized sheets, 5.60c. to 5.75c.; No. 10 blue annealed sheets, 3.60c. to 4c.; cold rolled rounds, 3.90c.; flats, squares and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.66c.; No. 9 annealed wire, \$3.50 per 100 lb.; No. 9 galvanized wire, \$3.95 per 100 lb.; common wire nails, \$3.60 base per 100 lb.

**Coke.**—The demand for foundry coke for prompt or March shipment has improved and some producers have advanced prices 25c. a ton. Quotations range from \$5 to \$6.50 for standard Connellsville foundry coke for prompt shipment.

**Old material.**—The market lacks strength and is quiet. The National Tube Co. has made additional purchases of considerable tonnage for its Lorain works at \$21 and \$21.25 and this grade has moved between dealers at \$20 to \$20.25. With this exception mills are not buying. Borings and turnings are soft owing to the absence of a local demand and have further declined about 50c. a ton and busheling and several other grades have been marked down 25c.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$19.00 to \$19.50
Rails for rolling .....	20.00 to 20.50
Rails under 3 ft. ....	21.00 to 21.50
Low phosphorus melting.....	21.50 to 21.75
Cast borings .....	16.00 to 16.50
Machine shop turnings.....	15.25 to 15.50
Mixed borings and short turnings.....	16.00 to 16.25
Compressed sheet steel.....	17.75 to 18.00
Railroad wrought .....	16.75 to 17.00
Railroad malleable .....	21.00 to 21.50
Light bundled sheet stampings.....	14.75 to 15.00
Steel axle turnings .....	16.75 to 17.25
No. 1 cast .....	22.00 to 22.50
No. 1 busheling .....	14.75 to 15.00
Drop forge flashings .....	14.25 to 14.50
Railroad grate bars .....	19.00 to 19.25
Stove plate .....	19.00 to 19.25
Pipes and flues .....	14.75 to 15.00

## Philadelphia

### Large Sales of Basic and Foundry Pig Iron—Steel Trade Continues Improvement

PHILADELPHIA, Feb. 11.—Another week of large pig iron sales has turned the Eastern market slightly upward, though the effect of the big business of the past two weeks has not yet been fully measured so far as market prices are concerned. There was one purchase of 30,000 tons of basic, another of 6000 tons, and these with the foundry iron sales probably bring the total for the week well over 60,000 tons.

In the steel trade there is no spectacular buying, but the gradual accumulation of small tonnages on mill books and the outlook each week since the first of the year has become increasingly better. Aside from plates, which are being produced at about 50 per cent of capacity in the East, the mills of this district are operating at about 75 per cent. Despite the increase of tonnage on mill books consumers and jobbers continue their policy of cautious buying and orders are nearly always for small amounts. Steel prices show some deviation in exceptional instances, but on the whole are fairly well maintained.

**Ferroalloys.**—Both domestic and British ferromanganese is quoted at \$107.50, furnace or seaboard. There are few sales.

**Coke.**—Spot furnace coke is available at \$4 to \$4.25, oven, and foundry coke at \$4.75 to \$5. For second quarter contracts quotations for furnace coke range from \$4.50 to \$4.75.

**Semi-Finished Steel.**—Buyers of billets are taking mostly small lots. Prices are unchanged at \$40, Pittsburgh, for rerolling quality and at \$45 for forging quality.

**Plates.**—The largest plate tonnages in sight are 35,000 tons for 4000 Norfolk and Western cars, contracts for which have been awarded, and 4000 tons for the car floats to be built for the New York Central Railroad. Plate orders are mostly small and cover a variety of products, mostly oil tanks, boilers and structural work. An oil company has bought 1000 tons of flanged and dished heads. Prices range from 2.30c., Pittsburgh, quoted only on exceptional tonnages, to 2.40c.

**Pig Iron.**—A sale of 30,000 tons of basic pig iron to an Eastern steel company was the feature of the week, which was also marked by fairly large sales of foundry iron. There was also a sale of 6000 tons of basic to another consumer. The larger tonnage, which was closed the early part of the week, went at \$1.25 a ton, delivered, below the smaller lot, taken later in the week. The large tonnage was taken by a steel company in the East at about \$21.50, delivered, but there were special circumstances surrounding the transaction, and it is probable that this price could not be duplicated regardless of the size of the tonnage. The 6000 tons was taken at \$22.75, delivered, and a smaller lot of basic was sold at \$23.50, delivered. In foundry iron there has been a considerable number of sales of tonnages ranging from 500 to 2000 or 3000 tons at prices ranging from \$22 to \$23, furnace, for No. 2 plain. Most of the eastern Pennsylvania furnaces are now in an easy position, one company, for example, having on its books more tonnage than it can produce in the first half with one furnace and it will probably be obliged to put a second furnace in blast. Another prominent seller has withdrawn from the market, at least temporarily. Nearly all sellers have advanced their quotations to \$23 base, furnace, with \$22.50 still as a possibility on some of the more attractive tonnages still pending. Two cast iron pipe companies, in addition to the one reported last week as having bought 20,000 tons or more, have placed orders for substantial lots. The Virginia situation has improved somewhat despite the fact that foreign iron is reported to have been sold for shipment to Norfolk. One or two Virginia furnaces



are up to \$26, base, and it is doubtful whether less than \$25, furnace, would be quoted in any case. A Virginia cast iron pipe company was a large buyer. Offerings of foreign iron are disturbing to the Eastern trade, and while no large amount has yet been sold, the prices quoted on foreign iron are so close to domestic prices that there is not much hope here that Eastern furnaces will be able to obtain prices much higher than those now prevailing. The Alan Wood Iron & Steel Co. has put out its No. 3 furnace for repairs. The Bethlehem Steel Co. expects to put one of its Coatesville furnaces in blast shortly, it having been banked for some months. The No. 1 furnace of the Witherbee-Sherman Co. at Port Henry, N. Y., is down for repairs.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	\$23.63 to \$24.13
East. Pa. No. 2X, 2.25 to 2.75 sil.	24.13 to 24.63
East. Pa. No. 1X.....	24.63 to 25.13
Virginia No 2 plain, 1.75 to 2.25 sil.	30.17 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.	30.67 to 31.67
Basic delivery eastern Pa.....	22.75 to 23.50
Gray forge .....	22.50 to 23.00
Malleable .....	23.75 to 24.25
Standard low phos. (f.o.b. furnace) .....	27.00 to 27.50
Copper bearing low phos. (f.o.b. furnace) .....	27.00 to 28.00

**Structural Material.**—Eastern structural mills are operating at approximately 75 per cent of capacity. Demand continues fairly good, although mostly in small tonnages so far as this district is concerned. Prices are unchanged at 2.35c. to 2.40c., Pittsburgh, the lower price probably being less frequently quoted because of the better position of the mills as to orders.

**Bars.**—A steady demand for bars continues. The market is perhaps not so active as in January, but in the aggregate the mills are getting a fair amount of tonnage. Quotations are fairly uniform at 2.40c., Pittsburgh, but occasional concessions of \$1 a ton are reported. Bar iron is unchanged at 2.25c. to 2.30c., Pittsburgh, the lower price being limited to a few mills.

**Sheets.**—Concessions from the so-called regular prices of sheets are attributed largely to one mill, which has taken orders at \$2 a ton below these prices. Most of the producers are holding firmly to 3c. for blue annealed, 3.85c. for black and 5c. for galvanized.

**Warehouse Business.**—Prices for steel products out of stock are unchanged, for local delivery being as follows:

Soft steel bars and small shapes, 3.47c.; iron bars (except bands), 3.47c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ½ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.57c.; tank steel plates, ½ in., 3.82c.; blue annealed steel sheets, No. 10 gage, 4.10c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.57c.; structural shapes, 3.57c.; diamond pattern plates, ¼ in., 5.40c.; ½ in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.27c.; narrower than 1 in., all gages, 4.77c.; steel bands, No. 12 gage to ½ in., inclusive, 4.27c.; rails, 3.47c.; tool steel, 8.50c.; Norway iron, 7c.

**Old Material.**—Sales of about 8000 tons of No. 1 heavy melting steel were made within the past week at \$18.50, delivered, most of this going to one mill. The material, however, was "distress" tonnage; that is it had been loaded on cars speculatively for a certain destination and was sold at the best price it would bring. Aside from these sales, the market appears fairly firm, although not so strong as a week ago. Other sales have been made at \$19 and \$20, which we continue as our quotations. Blast furnace borings and turnings are slightly easier, the best offers obtainable now being \$15.50, this being offered by dealers, with \$16 as the price which a consumer would probably be asked to pay. Machine shop turnings for rolling mill use are stronger, \$17 having been paid and \$17.50 is now quoted by dealers. Pipe is easier, sales having been made at \$18.50 and at \$19, both to the same consumer. Prices

paid for various grades of scrap sold by the Pennsylvania Railroad seem to point to the underlying strength of the market, but brokers and dealers are not so positive as to the continuance of its upward trend as they were a week or two ago.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$19.00 to \$20.00
Scrap rails .....	19.00 to 20.00
Steel rails for rolling.....	22.00 to 23.00
No. 1 low phos., heavy 0.04 and under .....	24.00 to 25.00
Couplers and knuckles .....	24.00 to 25.00
Cast-iron car wheels.....	21.00 to 22.00
Rolled steel wheels.....	24.00 to 25.00
No. 1 railroad wrought.....	22.00 to 23.00
No. 1 yard wrought.....	21.00 to 21.50
No. 1 forge fire .....	16.50 to 17.00
Bundled sheets (for steel works) .....	16.50 to 17.00
Mixed boring and turnings (for blast furnace use).....	15.50 to 16.00
Machine shop turnings (for steel works use) .....	16.50 to 17.00
Machine shop turnings (for rolling mill use).....	17.00 to 17.50
Heavy axle turnings (or equivalent) .....	17.00 to 18.00
Cast borings (for steel works and rolling mills) .....	16.50 to 17.00
Cast borings (for chemical plants) .....	18.00 to 18.50
No. 1 cast .....	21.00 to 22.00
Heavy breakable cast (for steel plants) .....	18.50 to 19.00
Railroad grate bars .....	18.00 to 18.50
Stove plate (for steel plant use) .....	17.00 to 18.00
Railroad malleable .....	18.50 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications) .....	18.50 to 19.00
Shafting .....	25.00 to 26.00
Steel axles .....	25.00 to 26.00

## FOREIGN SERVICE CHANGE

### Plan to Establish Permanent Status for Commercial Attachés

WASHINGTON, Feb. 12.—Strong efforts are being made by officials of the Department of Commerce to have enacted at the present session of Congress legislation to give a permanent status to the commercial attachés and trade services of the department. A measure to this end, prepared under the direction of the Department of Commerce, was introduced by Representative Winslow and is held to be of vital importance for the development of export trade for American industry. The bill establishes the foreign commerce service in the Bureau of Foreign and Domestic Commerce, and provides that officers of the service shall be given an official status in foreign countries by accrediting them to the governments of the countries to which they are assigned. At present commercial attachés and trade commissioners have no statutory standing and the only authorization for their employment is in the annual appropriation bills.

The Winslow measure, by establishing a permanent service, would do away with the uncertainty of the terms of commercial attachés and would assure reasonable coordination of the work of the attachés with the work of consular officers. The former is now under the supervision of the Department of Commerce, and the latter is under the supervision of the State Department.

Hearings were held last week before the House Committee on Interstate and Foreign Commerce on the Winslow bill, the witnesses including the Secretary of Commerce, Herbert Hoover, Director Julius Klein of the Bureau of Foreign and Domestic Commerce, officials in the foreign services of the department, and a group of business men. Among the latter were S. L. Nicholson of the Westinghouse Electric & Mfg. Co., president of the Associated Manufacturers of Electric Supplies, and Charles Lyon Chandler of the Foreign Commercial Department of the Corn Exchange National Bank, Philadelphia, who spoke for the Chamber of Commerce of that city.

It was declared by Secretary Hoover that the bill would provide a better and more direct coordination between consular officers of the State Department and commercial attachés and trade commissioners of the Department of Commerce.

# Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

## Plates

Sheared, tank quality, base, per lb.....2.50c.

## Structural Materials

Beams, channels, etc., base, per lb.....2.50c.  
Sheet piling .....2.65c.

## Iron and Steel Bars

Soft steel bars, base, per lb.....2.40c.  
Soft steel bars for cold finishing.....\$3 per ton over base  
Reinforcing steel bars, base.....2.40c.  
Refined iron bars, base, per lb.....3.10c. to 3.15c.  
Double refined iron bars, base, per lb.....4.75c.  
Stay bolt iron bars, base, per lb.....7.75c. to 8c.

## Hot-Rolled Flats

Hoops, base, per lb.....3c.  
Bands, base, per lb.....3c.  
Strips, base, per lb.....3c.

## Cold-Finished Steel

Bars and shafting, base, per lb.....3c.  
Bars, S. A. E. Series, No. 2100.....4.75c.  
Bars, S. A. E. Series, No. 2300.....6.25c. to 6.50c.  
Bars, S. A. E. Series, No. 3100.....5.25c. to 5.50c.  
Strips, base, per lb.....4.75c. to 5.00c.

## Wire Products

(To jobbers in car lots)

Nails, base, per keg.....\$3.00  
Galvanized nails, 1 in. and over.....\$2.25 over base  
Galvanized nails, less than 1 in.....2.50 over base  
Bright plain wire, base, No. 9 gage, per 100 lb.....\$2.75  
Annealed fence wire, base, per 100 lb.....2.90  
Spring wire, base, per 100 lb.....3.70  
Galvanized wire No. 9, base, per 100 lb.....3.35  
Galvanized barbed, base, per 100.....3.80  
Galvanized staples, base, per keg.....3.80  
Painted barbed wire, base, per 100 lb.....3.45  
Polished staples, base, per keg.....3.45  
Cement coated nails, base, per count keg.....\$2.60 to 2.70  
Bale ties, carloads to jobbers.....75 and 2 1/2 per cent off list  
Woven fence, carloads (to jobbers).....67 1/2 per cent off list  
Woven fence, carloads (to retailers).....65 per cent off list

## Bolts and Nuts

Machine bolts, small, rolled threads, 60, 10 and 5 per cent off list  
Machine bolts, all sizes, cut threads.....60 and 5 per cent off list  
Carriage bolts, 1/2 x 6 in.:  
Smaller and shorter, rolled threads.....60 and 5 per cent off list  
Carriage bolts, cut threads, all sizes.....50, 10 and 5 per cent off list  
Lag bolts.....65 and 5 per cent off list  
Plow bolts, Nos. 1, 2 and 3 heads.....50 and 10 per cent off list  
Other style heads.....20 per cent extra  
Machine bolts, c.p.c. and t. nuts, 1/2 x 4 in., 50 and 5 per cent off list  
Larger and longer sizes.....50 and 5 per cent off list  
Hot pressed squares or hex. nuts, blank.....4.25c. off list  
Hot pressed nuts, tapped.....4.25c. off list  
C.p.c. and t. square or hex. nuts, blank.....4c. off list  
C.p.c. and t. square or hex. nuts, tapped.....4c. off list  
Semi-finished hex. nuts:  
1/2 in. and smaller, U. S. S.....80 and 5 per cent off list  
1/2 in. and larger, U. S. S.....75 and 5 per cent off list  
Small sizes, S. A. E.....80, 10 and 5 per cent off list  
S. A. E., 1/2 in. and larger.....75, 10 and 5 per cent off list  
Stove bolts in packages.....75, 10 and 5 per cent off list  
Stove bolts in bulk.....75, 10, 5 and 2 1/2 per cent off list  
Tire bolts.....60 and 10 per cent off list  
Bolt ends with hot pressed nuts.....60 and 5 per cent off list  
Bolt ends with cold pressed nuts.....50 and 5 per cent off list  
Turnbuckles, with ends, 1/2 in. and smaller, 50 to 55 and 5 per cent off list  
Turnbuckles, without ends, 1/2 in. and smaller, 65 and 5 to 70 and 10 per cent off list  
Washers.....5c. to 5.25c. off list

## Semi-Finished Castellated and Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh.)

Per 1000			Per 1000		
1/4-in.	S. A. E.	U. S. S.	1/2-in.	S. A. E.	U. S. S.
1/4-in.	\$4.80	\$4.80	3/4-in.	\$15.00	\$15.00
1/2-in.	5.50	6.00	1-in.	19.50	20.00
3/4-in.	6.50	7.00	1 1/4-in.	28.50	28.50
1-in.	9.00	9.50	1 1/2-in.	37.00	37.50
1 1/4-in.	11.00	11.50	1 3/4-in.	58.50	60.50

Larger sizes—Prices on application.

## Cap and Set Screws

Milled hex. head cap screws.....75, 10 and 5 per cent off list  
Milled standard set screws, case hardened, 75, 10 and 5 per cent off list  
Milled headless set screws, cut thread, 75, 10 and 5 per cent off list  
Upset hex. head cap screws, U. S. S. thread, 80, 10 and 10 per cent off list  
Upset hex. head cap screws, S. A. E. thread, 80, 10 and 10 per cent off list  
Milled studs.....65 and 10 per cent off list

## Rivets

Large structural and ship rivets, base, per 100 lb.....\$2.75  
Small rivets.....70 and 10 per cent off list

## Track Equipment

Spikes, 1/2 in. and larger, base, per 100 lb.....\$3.05 to \$3.15  
Spikes, 1/2 in., 1/4 in. and 3/8 in., per 100 lb.....3.25 to 3.50  
Spikes, 1/4 in.....3.25 to 3.50  
Spikes, boat and barge, base, per 100 lb.....3.25 to 3.50  
Track bolts, 1/2 in. and larger, base, per 100 lb.....4.00 to 4.25  
Track bolts, 1/2 in. and 3/8 in., base, per 100 lb.....4.50 to 5.00  
Tie plates, per 100 lb.....2.60  
Angle bars, base, per 100 lb.....2.75

## Welded Pipe

### Butt Weld

Inches	Steel Black	Galv	Inches	Iron Black	Galv.
1/2	45	19 1/2	1/2 to 3/4	+11	+39
3/4 to 1	51	25 1/2	1/2	22	2
1 1/4	56	42 1/2	3/4	28	11
1 1/2	60	48 1/2	1 to 1 1/2	30	13
1 to 3	62	50 1/2			

### Lap Weld

2	55	43 1/2	2	23	7
2 1/2 to 6	59	47 1/2	2 1/2	26	11
7 and 8	56	43 1/2	3 to 6	28	13
9 and 10	54	41 1/2	7 to 12	26	11
11 and 12	53	40 1/2			

### Butt Weld, extra strong, plain ends

1/2	41	24 1/2	2 to 3	61	50 1/2
1/2 to 3/4	47	30 1/2	3/4 to 1	+19	+54
3/4	53	42 1/2	1 1/2	21	7
1	58	47 1/2	1 1/2 to 2	28	12
1 to 1 1/2	60	49 1/2	2	30	14

### Lap Weld, extra strong, plain ends

2	53	42	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1 1/2 points, with a supplementary discount of 5 per cent on galvanized.

## Boiler Tubes

Lap Welded Steel	Charcoal Iron
2 to 2 1/2 in.....27	1 1/2 in.....+18
2 1/2 to 3 in.....37	1 3/4 to 1 1/2 in.....+8
3 in.....40	2 to 2 1/2 in.....2
3 1/2 to 3 3/4 in.....42 1/2	2 1/2 to 3 in.....7
4 to 13 in.....46	3 1/4 to 4 1/2 in.....9

Less carload lots 4 points less.

## Standard Commercial Seamless Boiler Tubes

### Cold Drawn

1 in.....55	3 and 3 1/2 in.....36
1 1/4 and 1 1/2 in.....47	3 1/2 and 3 3/4 in.....37
1 3/4 in.....31	4 in.....41
2 and 2 1/4 in.....22	4 1/2 in. and 5 in.....33
2 1/2 and 2 3/4 in.....32	

### Hot Rolled

3 and 3 1/2 in.....38	4 in.....43
3 1/2 in. and 3 3/4 in.....39	

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

## Seamless Mechanical Tubing

Carbon under 0.30, base.....83 per cent off list  
Carbon 0.30 to 0.40, base.....81 per cent off list  
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

## Seamless Locomotive and Superheater Tubes

Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage.....15	2 1/4-in. O.D. 10 gage.....20
2-in. O.D. 11 gage.....16	3-in. O.D. 7 gage.....35
2-in. O.D. 10 gage.....17	1 1/2-in. O.D. 9 gage.....15
2 1/4-in. O.D. 12 gage.....17	5 1/2-in. O.D. 9 gage.....55
2 1/4-in. O.D. 11 gage.....18	5 1/2-in. O.D. 9 gage.....57

## Tin Plate

Standard cokes, per base box.....\$5.50

## Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb base.....\$11.00	20-lb. coating I. C.....\$14.90
8-lb. coating I. C.....11.30	25-lb. coating I. C.....16.20
12-lb. coating I. C.....12.70	30-lb. coating I. C.....17.35
15-lb. coating I. C.....13.95	35-lb. coating I. C.....18.35
	40-lb. coating I. C.....19.35

## Sheets

### Blue Annealed

Nos. 9 and 10 (base), per lb.....3c.

### Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.85c.

### Automobile Sheets

Regular auto body sheets, base (22 gage), per lb.....5.35c.

### Galvanized

No. 28 (base), per lb.....5c.

### Long Ternes

No. 28 gage (base), 8-lb. coating, per lb.....5.30c.

### Tin-Mill Black Plate

No. 28 (base), per lb.....3.85c.



# Prices of Raw Materials, Semi-Finished and Finished Products

## Ores

### Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Mesabi Bessemer, 55 per cent iron.....	6.20
Mesabi non-Bessemer, 51½ per cent iron.....	5.55

### Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian...	11.00c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	46c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	43c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, per unit, in 60 per cent concentrates .....	\$8.25 to \$10.00
Chrome ore, basic, 48 per cent Cr <sub>2</sub> O <sub>3</sub> , crude, per ton, c.i.f. Atlantic seaboard.....	18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS <sub>3</sub> , New York.....	75c. to 85c.

## Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	107.50
Ferrosilicon, 50 per cent, delivered.....	\$74.00 to 75.00
Ferrosilicon, 75 per cent.....	140.00
Ferrotungsten, per lb. contained metal.....	85c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered .....	10.75c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.....	10.50c.
Ferrovandium, per lb. contained vanadium	\$3.50 to \$4.00
Ferrocobaltititanium, 15 to 18 per cent, per net ton .....	200.00

## Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....	\$38.00 to \$40.00
Spiegeleisen, domestic, 16 to 19 per cent.....	37.00 to 38.00
Ferrosilicon, Bessemer, 10 per cent, \$42.50; 11 per cent, \$45; 12 per cent, \$47.50.	
Silvery iron, 5 per cent, \$30.00; 6 per cent, \$31.00; 7 per cent, \$32.00; 8 per cent, \$33.50; 9 per cent, \$35.50; 10 per cent, \$37.50; 11 per cent, \$40.00; 12 per cent, \$42.50.	

## Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	\$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines .....	23.50
Per 1000 f.o.b. works:	
Fire Clay:	
Pennsylvania .....	High Duty \$42.00 to \$45.00 Moderate Duty \$37.00 to \$42.00
Maryland .....	47.00 42.00
Ohio .....	42.00 to 43.00 37.00 to 39.00
Kentucky .....	42.00 to 43.00 37.00 to 39.00
Illinois .....	37.00 to 42.00
Missouri .....	42.00 to 45.00 35.00 to 40.00
Ground fire clay, per net ton.....	6.00 to 7.00
Silica Brick:	
Pennsylvania .....	\$40.00 to 42.00
Chicago .....	49.00
Birmingham .....	50.00
Ground silica clay, per net ton.....	8.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	47.00

## Semi-Finished Steel, F.O.B. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$40.00
Rolling billets, 2-in. and under.....	\$40.00 to 42.50
Forging billets, ordinary carbons.....	45.00
Sheet bars, Bessemer.....	42.50
Sheet bars, open-hearth.....	42.50
Slabs .....	40.00
Wire rods, common soft, base, No. 5 to ¼-in.....	51.00
Wire rods, common soft, coarser than ¼-in...\$2.50 over base	
Wire rods, screw stock.....	\$5.00 per ton over base
Wire rods, carbon, 0.20 to 0.40.....	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55.....	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75.....	7.50 per ton over base
Wire rods, carbon over 0.75.....	10.00 per ton over base
Wire rods, acid.....	15.00 per ton over base
Skelp, grooved, per lb.....	2.30c. to 2.35c.
Skelp, sheared, per lb.....	2.30c. to 2.35c.
Skelp, universal, per lb.....	2.30c. to 2.35c.

## Finished Iron and Steel, F.O.B. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails light, new steel, base, lb.....	2c. to 2.15c.
Rails, light, rerolled, base, per lb.....	1.85c. to 2.00c.
Spikes, ¾-in. and larger, base, per 100 lb....	\$3.00 to \$3.15
Spikes, ½-in. and smaller, base, per 100 lb....	3.25 to 3.50
Spikes, boat and barge, base, per 100 lb.....	3.25 to 3.50
Track bolts, ¾-in. and smaller, base, per 100 lb.	4.00 to 4.25
Track bolts, ¾-in. and larger, base, per 100 lb.	4.50 to 5.00
Tie plates, per 100 lb.....	2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb., Chicago mill	2.40c.
Bars, common iron, Pittsburgh mill.....	2.40c.
Bars, rails, steel reinforcing, base, per lb.....	2.15c. to 2.25c.
Cold finished steel bars, base, Chicago per lb..	3c.
Ground shafting, base, per lb.....	3.40c.
Cut nails, base, per keg.....	\$3.15 to \$3.25

## Alloy Steel

S.A.E. Series Numbers	Bars 100 lb.
2100* (¼% Nickel, 10 to 20 per cent Carbon)...	\$3.50
2300 (3½% Nickel) .....	\$5.00 to 5.25
2500 (5% Nickel) .....	7.75 to 8.00
3100 (Nickel Chromium) .....	4.00 to 4.25
3200 (Nickel Chromium) .....	5.75 to 6.00
3300 (Nickel Chromium) .....	8.00 to 8.25
3400 (Nickel Chromium) .....	7.00 to 7.25
5100 (Chromium Steel) .....	2.75
5200* (Chromium Steel) .....	7.50 to 8.00
6100 (Chromium Vanadium bars).....	4.75 to 5.00
6100 (Chromium Vanadium spring steel).....	4.50 to 4.75
9250 (Silico Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium) .....	5.00 to 5.25
Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum) .....	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum) .....	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.75 to 5.00

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets the net ton bar price applies.

\*Not S.A.E. specifications, but numbered by manufacturers to conform to S.A.E. system.

## Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, carload lots, 36,000 lb. minimum carload, per 100 lb.:

Philadelphia, domestic, \$0.32	Buffalo .....	\$0.265	St. Louis .....	\$0.42	*Pacific Coast.....	\$1.15
Philadelphia, export... 0.235	Cleveland .....	0.215	Kansas City.....	0.735	*Pac. Coast, ship plates	1.20
Baltimore, domestic... 0.31	Cleveland, Youngstown	0.19	Kansas City (pipe)...	0.705	Birmingham .....	0.58
Baltimore, export..... 0.225	Comb .....	0.29	St. Paul .....	0.60	Memphis .....	0.56
New York, domestic... 0.34	Detroit .....	0.29	Omaha .....	0.735	Jacksonville, all rail..	0.70
New York, export..... 0.255	Cincinnati .....	0.31	Omaha (pipe) .....	0.705	Jacksonville, rail and	
Boston, domestic..... 0.365	Indianapolis .....	0.31	Denver .....	1.26	water .....	0.415
Boston, export..... 0.255	Chicago .....	0.34	†Denver (pipe) .....	1.17	New Orleans .....	0.67

\*Applies minimum carload 80,000 lb. †Minimum loading 46,000 lb.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingots and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cables and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2½c. per in. or fraction thereof additional. All rates per 100 lb. in carload lots, minimum 36,000 lb.

## FABRICATED STEEL BUSINESS

### Lessened Activity Both as to Lettings and Inquiries Noted in Structural Work

A slight falling off in the volume of fabricated steel work, both as to contracts let and inquiries pending, is indicated by the reports for the past week. Contracts awarded called for close to 20,000 tons of steel, which is somewhat less than the weekly average since the first of the year. Projects pending total about 19,000 tons. There is an absence of the very large tonnages which marked the first month of the year.

Considerable work is in prospect, however. Bids will be taken in March on 20,000 tons for the floor and stiffening trusses for the Delaware River bridge at Philadelphia. Later bids will be taken also on 20,000 tons of steel for the approaches for the same bridge.

#### Awards include:

Harriman National Bank, Fifth Avenue and Forty-fourth Street, New York, 4000 tons reported to have been awarded to Post & McCord.

Public School No. 109, New York, 1300 tons, to Levering & Garrigues Co.

Public School No. 116, New York, 1000 tons, to the George A. Just Co.

Garage, at Philadelphia, 250 tons, to Belmont Iron Works.

National Fireproofing Co., Perth Amboy, N. J., 400 tons, to Belmont Iron Works.

Lebanon Paper Box Co., Lebanon, Pa., 350 tons, to McClintic-Marshall Co.

Highway bridge repairs at Atlantic City, 425 tons, to Bethlehem Steel Co.

Temple Bar Building, Brooklyn, 300 tons, to George A. Just Co.

Office building, Forty-fourth Street and Lexington Avenue, 900 tons, to A. E. Norton Co.

New York Central Railroad, buildings at Albany, N. Y., 700 tons, to American Bridge Co.

Boston & Albany, station at Springfield, Mass., 1200 tons, to Levering & Garrigues Co.

Balmar Co., Baltimore, 700 tons, to unnamed fabricator.

Pennsylvania Railroad, bridge over Auglaize River, Auglaize, Ohio, 354 tons, to American Bridge Co.

Saenger Theater, Pensacola, Fla., 255 tons, to Ingalls Iron Works.

Donner Steel Co., Buffalo, ore bridge, 500 tons, to Milwaukee Bridge Co.

Monaghan Machine Co. plant, Chicago, 350 tons, to Hansell-Elcock Co.

Lerner Theater, Elkhart, Ind., 300 tons, to Forest City Steel & Iron Co., Cleveland.

Union Terminal Warehouse building, Los Angeles, 892 tons, reinforced concrete construction substituted.

Martha Realty Co. building, Kansas City, Mo., reinforced concrete construction substituted.

H. J. Heinz Co. branch, Muscatine, Iowa, 100 tons, to Jones & Laughlin Steel Corporation.

Philadelphia Co., Pittsburgh, building extension, 1200 tons, to McClintic-Marshall Co.

McKinney Steel Co., Cleveland, head frame for Dunn mine, Crystal Falls, Mich., 250 tons, bids taken.

Cattle barn, Ohio State Fair Grounds, 400 tons, general contract awarded to Cleveland fabricators, who will sublet steel work.

General Match Co., Cincinnati, 250 tons, general contract to Hodges-Erwin Co.

Union Gas & Electric Co., Cincinnati, 1500 tons sheet piling, general contract to the Foundation Co.

M. E. R. & L. Co., Milwaukee, addition to Lakeside steam generating plant, St. Francis, 150 tons, to Worden-Allen Co.

Robert W. Adams Co., Ironton, Minn., smelter mill building, 165 tons, to Lakeside Bridge & Steel Co.

A. O. Smith Corporation, Milwaukee, additions, 100 tons, to Worden-Allen Co.

United Market Square Building Co., Cleveland, bank and office building, 1450 tons, with the Bethlehem Steel Co.

Public Service Investment Co., transmission towers between South Chicago and Gary, 1100 tons, to Riter-Conley Co.

#### Structural Projects Pending

Inquiries for fabricated steel work include the following:

Public Service Corporation of New Jersey, 200 tons. (This is in addition to the 2000 tons reported last week for a power plant addition.)

Belle Harbor, Long Island, telephone exchange addition, 150 tons.

Edison Co., power house at Long Beach, Cal., 2500 tons.

Florida East Coast Railway, bridge, Jacksonville, Fla., 5000 tons.

New England Fuel & Transport Co., Boston, coal handling plant, 1000 tons.

Delaware & Hudson Railroad, bridge at Troy, N. Y., 800 tons.

Shriners' Temple, Brooklyn, 500 tons.

Hooven, Owens, Rentschler Co., Hamilton, Ohio, addition, tonnage unstated, bids in.

Union Gas & Electric Co., Cincinnati, power plant, estimated 5300 tons, bids to be taken shortly.

Providence Gas Co., Providence, R. I., office building and store, 250 tons.

National Can Co., Boston, manufacturing plant, 100 tons.

Keith Theater, Boston, theater, Washington and Essex Streets, 1200 tons.

Employers' Liability Insurance Co., Boston, office building, 1700 tons.

Synagogue, Thirty-third and Diamond Streets, Philadelphia, 250 tons.

## RAILROAD EQUIPMENT BUYING

### Norfolk & Western Orders 4000 Cars—Other Awards Bring Week's Total Up to 6095

The Norfolk & Western Railroad has distributed orders for 4000 all-steel hopper cars, which will require about 50,000 tons of plates, shapes and bars. This is the largest railroad equipment order of the week. The Atchison, Topeka & Santa Fe contracted for 2000 box cars, and other miscellaneous orders bring the week's total up to 6095. Inquiries are pending for 2375 cars. The New York Central Railroad, which recently bought 80 switching engines, is reported to be getting figures on considerable passenger and freight motive power equipment.

The Lehigh Valley has placed contract for the repair of 200 box cars with the Standard Steel Car Co.

The Atchison, Topeka & Santa Fe has divided an order for 2000 box cars between the American Car & Foundry Co. and the Pullman Co.

The National Tube Co. is inquiring for 50 all-steel hopper car bodies and 25 steel flat cars.

The Central of Brazil is reported to be inquiring for 35 broad gage and 8 narrow gage locomotives, 12 passenger cars, 12 sleeping cars, 6 steel baggage cars and 6 steel mail cars for broad gage lines; 4 sleeping cars for narrow gage lines; 100 refrigerator cars, 550 freight cars for broad gage lines and 300 freight cars for narrow gage lines.

The New York, Chicago & St. Louis is inquiring for 300 steel underframe double deck stock cars and 1000 automobile box cars.

The New York Central has ordered 75 extension-side dump cars from the Clark Car Co.

The New York, New Haven & Hartford has ordered 10 gasoline motor cars from the Sykes Co.

The Pittsburgh & West Virginia is inquiring for 2 Pacific type and 1 Mikado type locomotive.

The Chesapeake & Ohio has authorized the repair of 500 steel gondola cars in the shops of its subsidiary, the Hocking Valley.

The Swift Refrigerator Transportation Co., Chicago, is inquiring for 100 20-ton double-deck stock cars; this is in addition to its inquiry for repairs to 100 stock cars.

The American Car Products Co. has ordered 10 insulated tank cars of 10,000-gal. capacity from the Chicago Steel Car Co.

The Murray-Ohio Mfg. Co., Cleveland, manufacturer of sheet metal stampings for automobiles, has leased, with an option to purchase, the Torbensen Axle plant of the Eaton Axle & Spring Co., at 1115 East 152nd Street, which it will begin to operate about May 1. It has sold its old plant on Grand Avenue. The new plant will provide 150,000 sq. ft. of floor space or double the amount of floor space the company has in its present plant. The machinery in the Torbensen plant which was owned by the Eaton company, has been moved to the Eaton Axle plant.



## NON-FERROUS METALS

### The Week's Prices

		Cents per Pound for Early Delivery			
		Copper, New York Straits		Lead	
		Tin		Zinc	
		Lake	Electro-lytic*	New York	St. Louis
Feb.					
6.....	12.75	12.37 1/2	51.87 1/2	8.65	8.40
7.....	12.75	12.25	53.12 1/2	8.75	8.50
8.....	12.75	12.37 1/2	53.00	8.90	8.75
9.....	12.75	12.37 1/2	....	8.90	8.85
11.....	12.75	12.50	52.00	8.90	8.85

\*Refinery quotation; delivered price 1/4 c. higher.

### New York

NEW YORK, Feb. 11.

The markets are all fairly active and strong. Copper is advancing again on good demand and buying of tin has been heavy. A scarcity of lead is still a feature and the zinc market continues to gain strength.

**Copper.**—After falling to further low levels on this movement electrolytic copper has again turned higher and prices are advancing. There are substantial inquiries before the market and metal available at 12.62 1/2 c., delivered, has disappeared and the minimum is now 12.75 c. For the last week the export, or f.a.s., price has been gradually advancing from 12.40 c. a week ago to not less than 12.60 c. today and this has always been regarded as a sign of a stronger domestic market. Lake copper is quoted nominal at 12.75 c. delivered.

**Tin.**—A wild and exciting market has been the feature of the past week. The total business up to the close Saturday, Feb. 9, was not less than 2500 tons and possibly 3000. The bulk of the business was between dealers, but on Feb. 6 consumers were moderately active. Those who were sellers a week ago turned buyers during this period. A prominent London operator is now on this side. The premium on spot metal is now large and February metal is also selling at a premium. The largest business last week was done on Feb. 5 when 1500 tons changed hands with everybody apparently buying. Today the market is apparently slowing down and is considerably quieter with spot Straits tin quoted at 52 c., New York. Today 200 tons of futures sold on the metal exchange at 51 c. From Tuesday to Friday last week about 600 tons was also sold on the metal exchange. London prices today are considerably higher than last Tuesday, Feb. 5, with spot standard quoted at £266, future standard at £262 17s. 6d. and spot Straits at £266 5s. per ton. Arrivals thus far this month have been 1825 tons, with 11,315 reported afloat.

**Lead.**—The leading interest again advanced its price on Feb. 7 \$2 per ton to 8.25 c., New York. The outside market continues to advance and quotations which are reliable are difficult to obtain. Prompt lead has sold as high as 8.75 c. to 9 c., New York, and quotations in the West range as high as 8.85 c., St. Louis. The consumption of lead is still very heavy and it is stated that, in some cases, large consumers are finding it difficult to obtain the metal.

**Zinc.**—An advancing tendency still pervades the market. Prime Western for February and March delivery has advanced to 6.70 c. to 6.75 c., St. Louis. While demand from consumers is only fair, there has been active buying by dealers and operators. The tendency of ore prices is higher and this is a factor in the market.

**Nickel.**—Shot and ingot nickel are quoted unchanged at 29 c. to 32 c. per lb., with electrolytic nickel held at 32 c. by the leading producers. In the outside market both shot and ingot nickel are quoted at 29 c. to 32 c. per lb.

**Antimony.**—Conditions are altered but little and Chinese metal continues scarce, with wholesale lots for early delivery still at a minimum of 10.50 c. per lb., duty paid, New York.

**Aluminum.**—Virgin metal, 98 to 99 per cent pure, is quoted at 27.50 c. to 28 c. per lb., duty paid, delivered, by importers able to obtain the metal from foreign

producers. The leading American producer does not make public any quotations.

**Old Metals.**—Inquiry is more active but values show little change. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	12.25
Copper, heavy and wire.....	11.25
Copper, light and bottoms.....	10.00
Heavy machine composition .....	10.50
Brass, heavy .....	8.00
Brass, light .....	6.25
No. 1 red brass or composition turnings..	9.00
No. 1 yellow rod brass turnings.....	7.25
Lead, heavy .....	7.75
Lead, tea .....	6.50
Zinc .....	5.00
Cast aluminum .....	18.50
Sheet aluminum .....	18.50

### Chicago

FEB. 11.—Tin, lead and zinc have advanced and, among the old metals, lead and tin grades are higher. Lead buying has been active with offerings restricted. It is said that only one important seller is able to make prompt shipments. Zinc is stronger as a result of heavier export demand. We quote in carload lots: Lake copper, 13 c.; tin, 53.50 c.; lead, 9 c.; spelter, 6.75 c.; antimony, 12 c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 10.50 c.; copper bottoms, 9.50 c.; red brass, 8.75 c.; yellow brass, 7 c.; lead pipe, 7 c.; zinc, 4.25 c.; pewter, No. 1, 29 c.; tin foil, 34 c.; block tin, 40 c.; all buying prices for less than carload lots.

### To Reduce Number and Size of Nuts and Bolts for Farm Use

WASHINGTON, Feb. 12.—For the purpose of reducing the number of sizes and types of nuts and bolts now used on farm implements and machinery, a conference will be held here on Feb. 19 under the auspices of the Division of Simplified Practice, Department of Commerce, the department has announced. Representatives of the National Association of Farm Equipment manufacturers who suggested the meeting as well as distributors and users of farm equipment have been invited to attend, with manufacturers of nuts and bolts.

Leaders of the National organization expressed the view that the adoption of a few standard sizes and types can eliminate costly delays to the farms and save material and labor costs in manufacture and much confusion and expense to distributors who handle spare parts.

Carnegie Steel Co. has asked for bids covering a large coke unloading plant at Mingo Junction on the Ohio River. The plant will occupy 1650 ft. of river frontage and will be protected with concrete ice breakers. The plant will be equipped with duplex hoisting and loading rigs and conveyor equipment and will be capable of catering to river, rail and plant requirements. About 50,000 cu. yd. of dredging will be required for the harbor and foundations. Material needed for the initial work is 75,000 cu. yd. of concrete and 1000 piles. It is hoped to have the plant completed and in operation by Sept. 1.

Henry O. Loebell, vice-president and general manager Combustion Utilities Corporation, New York, was the speaker at the annual meeting of the Mechanical Section, Engineers' Society of Western Pennsylvania, at the William Penn Hotel, on Feb. 5. His subject was, "A New Thought in Fuel Engineering."

An international exhibition is to be held in Dunedin, New Zealand, opening about Nov. 1, 1925. Though an exhibition company has been formed for convenience of organization, the New Zealand Government has given its patronage to the project, and is also assisting it financially.

## PERSONAL

D. Alan Burt, formerly vice-president and controller of the Wheeling Steel Corporation, Wheeling, W. Va., and now a member of the Wheeling investment firm of Hazlett & Burt, and George W. Hannan, president and general manager Washington Tin Plate Co., Washington, Pa., recently were elected directors of the Hazel-Atlas Glass Co., Wheeling.

George D. Benson has joined the sales organization of the Stocker-Rumely-Wachs Co., Chicago. He was formerly with the Federal Machinery Sales Co., Chicago.

George W. Mixter, formerly connected with the Pierce-Arrow Motor Car Co., has become associated with Day & Zimmerman. He will give special attention to industrial work and will make headquarters at the New York offices of the company.

H. C. Strom, who has been western manager of the Pittsburgh Steamship Co. at Duluth, has been appointed manager of traffic with headquarters in Cleveland, to succeed A. H. Ferbert, who was recently elected vice-president.

C. Garness, formerly with the American Car & Foundry Co., has been appointed supervising engineer of railway car inspection by the Robert W. Hunt Co., Chicago. He was graduated as a mechanical engineer from the Technical School of Bergen, Norway, and after being associated with the Westinghouse Electric & Mfg. Co. and the Carnegie Steel Co., entered the engineering department of the Standard Steel Car Co. at Butler, Pa., where he remained four years. During the past 12 years Mr. Garness has been associated with the Car & Foundry company, first in its general office at St. Louis and also at its Detroit shops during 1917 and 1918, while that plant was engaged in the production of ammunition and vehicles for purposes of war. Since that time he has been mechanical engineer at the American Car & Foundry Co. shops in Chicago.

Robert Craig has resigned as chief engineer of the Dayton Scale Co., Dayton, Ohio, and will open an office as consulting mechanical engineer in Dayton.

James S. Ervin, formerly in charge of sales of mineral rubber and special asphalts, has been appointed manager of sales for the H. H. Robertson Co., Pittsburgh, to succeed C. D. Mercer, who has resigned.

Charles L. Newcomb, works manager of the Deane works of the Worthington Pump & Machinery Corporation at Holyoke, Mass., and Mrs. Newcomb were guests of the employees of the works on Jan. 17, in honor of their fiftieth wedding anniversary. Through C. Phillip Coleman, New York, president, the corporation presented to Mr. and Mrs. Newcomb a loving cup in token of the esteem in which Mr. Newcomb is held by his business associates.

Walter F. Dixon, works manager at the Elizabethport plant of the Singer Mfg. Co. and vice-president of the Diehl Mfg. Co., has been appointed secretary of the Machine Shop Practice Division of the American Society of Mechanical Engineers, to succeed Kenneth H. Condit, who has resigned to become a member of the Publication and Papers Committee.

William W. Brierly, president and general manager, Millbury Steel Foundry Co., Millbury, Mass., was elected a director of the Millbury National Bank at a stockholders meeting held Jan. 8. He is also a trustee of the Millbury Savings Bank.

D. Walter Phillips, who was associated with the Chapman Valve Mfg. Co., Indian Orchard, Mass., has been made superintendent of the Millbury Steel Foundry Co., Millbury, Mass.

A. L. Ralston, for the past two years Detroit district sales manager for the Crucible Steel Co. of America, has resigned that position to become general manager of sales for the Braeburn Alloy Steel Corpora-

tion, Braeburn, Pa. Before going to Detroit Mr. Ralston was Pittsburgh district sales manager for the Crucible Steel Co. for several years.

W. H. Patterson, for several years with the Westinghouse Electric & Mfg. Co. as manager of the resale industrial sales department, and more recently sales manager for the Kaestner & Hecht Elevator Co., Chicago, has joined the John H. Dunham Co., Wrigley Building, Chicago, as vice-president. He is a graduate of Purdue University.

Scott B. Lilly, for several years eastern district sales representative of the Ohio Locomotive Crane Co., Bucyrus, Ohio, has resigned to become associated with Philip T. King, 30 Church Street, New York, dealer in used locomotive cranes and representative of the Bedford Foundry & Machine Co. Mr. Lilly is a graduate of Cornell University and was at one time professor of civil engineering at Swarthmore College. He was also an instructor in the college of civil engineering at Cornell University.

Charles Blesch is now in charge of the Cleveland office of the Combustion Utilities Corporation and will direct the activities of the company in northern Ohio. He formerly spent a considerable time with the Lorain plant of the National Tube Co. and was graduated from Carnegie Institute of Technology in Mechanical Engineering.

Edward B. Meissner, who has been vice-president of the St. Louis (Mo.) Car Co. since 1916, has been elected president of the company, to succeed John I. Beggs, who, at his own request, was made chairman of the board. Twenty-five years ago, Mr. Meissner was an office boy for the Milwaukee Electric Railway & Light Co., of which Mr. Beggs was president. After a night-school course Mr. Meissner got into the accounting department of the Milwaukee company, and learned first stenography, then electricity and commercial law. Later he became chief clerk in Mr. Beggs' office, and in February, 1911, went to St. Louis as assistant to Mr. Beggs, who had become president of the car company.

President T. W. Guthrie of the Hillman Coal & Coke Co., Pittsburgh, has been appointed a member of a committee named by President J. C. Brydon of the National Coal Association to cooperate with similar committees from other organizations to act in an advisory capacity to the Coal Division of the Department of Commerce.

Thomas H. Close has been appointed sales manager of the Holcomb & Hoke Mfg. Co., Indianapolis, succeeding H. E. Steiner, who resigned some time ago.

George P. Spear, manager Corbin screw division of the American Hardware Co., New Britain, Conn., has returned from a trip to Florida.

Charles H. Tinker, formerly New England representative for the Republic Iron & Steel Co., is president and manager of the Charles H. Tinker Co., Boston, plumbers' supplies.

Douglas P. Cook, president Boston Pressed Metal Co., Worcester, Mass., and H. P. Blumenauer, president Arcade Malleable Iron Co. of that city, have been made vice-presidents of the Employers' Association of Central Massachusetts.

Professor George B. Waterhouse, Massachusetts Institute of Technology, gave an address at the Engineers' Club, Boston, on Feb. 14 on "Important Modifications of the Basic Open-Hearth Process" before members of the American Institute of Mining and Metallurgical Engineers.

M. H. Robert, vice-president Franklin Railway Supply Co., New York, gave an address on "The Past and Future of Steam Locomotive Engine Development" before the Boston section of the American Society of Mechanical Engineers at the Engineers Club, Boston, on Thursday evening, Feb. 7.

J. H. Roberts, until recently vice-president of the Atlas Steel Corporation, has been appointed eastern sales manager for the Vanadium-Alloys Steel Co., with offices at 143 Liberty Street, New York.



David O. Stewart has been appointed district sales representative for the Ohio Electric & Controller Co., St. Louis, effective Feb. 15, vice Thomas E. Beasley, who resigned to engage in other business. Mr. Stewart's office will be in the Bank of Commerce Building, St. Louis.

H. M. Bringham has been appointed representative in the Chicago district, with headquarters at 208 South La Salle Street, Chicago, for the Massillon Steel Joist Co., Massillon, Ohio.

Walter Barrows, 3rd, who for many years has been engaged in the pig iron industry both as an operator and in selling, and who is now an officer of the Goshen Furnace Corporation, Goshen, Va., has engaged in business for himself with offices in the Bankers' Trust Building, Philadelphia. He will handle sales of pig iron, coal and coke.

C. M. Porcher, manager New York office of the Pittsburgh Steel Co., has resigned and M. E. Johnson, assistant general manager of sales in charge of the export department, with headquarters in New York, has assumed Mr. Porcher's duties.

### Ore and Coal Lands in Alabama Acquired— May Build Blast Furnaces

ST. LOUIS, Feb. 11.—Harry Scullin, president Scullin Steel Co., and his associates have acquired by purchase and option 41,000 acres of land in the Raccoon Mountains of northeast Alabama. The land is said to have 20,000 tons of iron ore and 9000 tons of metallurgical coal to the acre.

The property is located near Guntersville on the Tennessee River. With the completion of the Muscle Shoals Dam, it is planned to place the ore and coal on barges at Guntersville, tow it up the Tennessee River to Paducah, thence by the Ohio River to the Mississippi and up to St. Louis. Until the dam is completed, the ore and coal will be hauled by rail from Guntersville to Florence, 75 miles distant, for shipment by barge.

The company plans to build its own barges and tow boats, and to erect blast furnaces in St. Louis. Mr. Scullin said that \$25,000,000 would be expended in the enterprise. He declined to give the names of his associates.

## OBITUARY

R. F. JOHNSTON, for many years correspondent of THE IRON AGE at Birmingham, Ala., died Feb. 10 after a long illness. A more extended notice will be published next week in this column.

W. W. TOTMAN, field representative during the past 20 years for the Whitney Mfg. Co., Hartford, Conn., died at the Hartford Hospital on Feb. 7. Before joining the Whitney company he was connected with the Pratt & Whitney Co., Boston Gear Works and the Fellows Gear Shaper Co.

FRANK H. MORSE, president and founder Morse-Rogers Steel Co., Cleveland, jobber in steel products, died Feb. 7, aged 63 years. He was born in Wallingford, Conn., and located in Cleveland in 1906, when he engaged in the steel jobbing business under the name of the Morse & Son Co. In 1920 this became the Morse-Rogers Steel Co. A son, Harold V. Morse, is general manager of that company. Mr. Morse was a Knight Templar, a member of the Cleveland Chamber of Commerce and other organizations.

JOSEPH J. LACY, president James J. Lacy Co., iron founders, and owner of the Enterprise Brass Works, both of Baltimore, died Feb. 7 at his home in that city, after an illness of several months. He was the eldest son of James J. Lacy and succeeded his father as president of the foundry company.

BERNARD SCHUTZ, president Eagle Smelting & Refining Co. and of the Somerville Iron Works, with offices at 233 Broadway, New York, died at his home on Feb. 6, aged 70 years.

### Brick Swollen by Carbon Deposition in a Southern Blast Furnace

LaFollette Coal & Iron Co.'s blast furnace at LaFollette, Tenn., after being out six weeks for repairs, blew in Feb. 5. The primary reason for shutting down was a damaged shell and top lining. Eight months after blowing in, June 7, 1922, rivets in three of the horizontal seams 12 to 20 ft. below the tunnel head began to shear and from that time until blowing out the middle of December, 1923, there was a steady, progressive upward movement of the entire top of the furnace, totaling 25 in., lifting the skip incline out of place, also the downcomer connections, and causing a general misalignment of the top structure. There was also 8-in. to 12-in. expansion horizontally, ripping the shell open all the way from 6 ft. below the tunnel head to 20 ft. below, or a vertical distance of about 14 ft. Bands were placed around the shell, but the movement continued and burst several of the bands. The furnace continued to work satisfactorily, so far as production and fuel consumption were concerned.

After blowing out, a careful inspection indicated that, although the in-wall was sound, practically all the top brick were badly disintegrated, also the concrete backing, and the entire top lining was ready to crumble into the furnace. Many of the brick that were originally 3-in. thick were swollen to a thickness of 3½ to 3¾ in. They were also badly discolored, resembling very much the disintegrated brick photographed and described by Nesbitt and Bell in their paper read before the Iron and Steel Institute last May. The trouble appeared to be due to carbon deposition. An analysis of the damaged brick indicated 6 per cent carbon and 2.40 per cent total iron. No determination of iron in the brick, when first put in, was available, but similar standard brick that were supplied for repairing the top, by the same well known manufacturer, were analyzed and 0.090 per cent total iron was found.

The top was protected from falling stock by ¼-in. steel wearing plates 6-in. wide, extending through the fire brick, and anchored into a concrete back wall. This construction has been used successfully in several furnaces in the South and elsewhere, but apparently new variables have entered that complicate the problem of constructing a satisfactory top lining. Its solution appears to lie within the province of the manufacturers of fire brick.

LaFollette furnace operates on foundry iron, producing 225 to 250 tons daily on an ore yield of 45 per cent. The ores used are chiefly Southern brown and red hematites. There is very little zinc in evidence. The furnace is 80 ft. high by 18 ft. in the bosh, and 12 ft. hearth diameter.

### Steel Corporation's Orders Increase

Unfilled business on the books of the United States Steel Corporation on Jan. 31, totaled 4,798,429 tons or 353,090 tons more than on the books of the company on Dec. 31. In December, there was a gain of 76,755 tons in the unfilled business, but before that until as far back as April, 1923, decreases were reported each month. The corporation has more unfilled business on its books than at any previous time since Sept. 30, 1923. A year ago the unfilled business amounted to 6,910,776 tons or 2,112,347 tons more than on Jan 31 last.

Following is the unfilled tonnage on the books of the corporation as reported by months beginning with January, 1922:

	1924	1923	1922
Jan. 31.....	4,798,429	6,910,776	4,241,678
Feb. 28.....		7,283,989	4,141,069
March 31.....		7,403,332	4,494,148
April 30.....		7,288,509	5,096,913
May 31.....		6,981,351	5,254,228
June 30.....		6,386,261	5,635,531
July 31.....		5,910,763	5,776,161
Aug. 31.....		5,414,663	5,950,105
Sept. 30.....		5,035,750	6,691,607
Oct. 31.....		4,672,825	6,902,287
Nov. 30.....		4,368,584	6,840,242
Dec. 31.....		4,445,339	6,745,703

## IMPORTED IRON IN PROSPECT

### Sales Reported—Steel Also Available—Short Shipments of British Sheets to Japan Reported

NEW YORK, Feb. 11.—Although export trade is still quiet, an improvement is expected to result from the negotiation of the Japanese loan in the United States and Great Britain, which is in addition to a smaller bond issue being arranged in the United States by a commission headed by the vice-president of the Yokohama Specie Bank. The recent inquiry of the South Manchuria Railway Co. for about 13,500 meters of gas pipe is not known to have been awarded in its entirety. About 2000 meters was placed with Mitsui & Co., New York. The inquiry of the Asahi Oil Co. for 2000 boxes of tin plate has not been awarded.

A few small inquiries from Japanese merchants for light gage black sheets are reported, but these are apparently for the purpose of establishing the current price. It is said that British mills operating on black sheet orders placed by Japanese buyers following the earthquake have been shipping short on orders, in some cases, by as much as 50 per cent. If lower quotations can be obtained today, it is expected that Japanese merchants will refuse to extend letters of credit for shipments in arrears and reorder elsewhere.

While the Chinese market is still quiet as a result of the recent holidays, some light business is being booked. One exporter to China reports orders for 110 tons of 35-lb. rails, about 25,000 spikes, 22 frogs and switches and some light car equipment. A few small orders for pipe are noted. Exporters to China are,

as is usually the case, in the market for wire shorts.

Although importers of foreign steel have quoted in several instances on good-sized tonnages, buyers seem to expect greater savings than the full delivered price affords. Reports are current of purchases of structural steel of Continental origin, but no sale of any size is known to have been made. Disinclination to buy foreign steel is apparently strong in some cases. One importer recently quoted about \$38 per ton delivered consumers' works on a tonnage of billets, the best domestic price obtainable by this consumer being about \$44.50 per ton delivered. The prospective purchaser, however, despite the \$6.50 difference in price sought a lower quotation on the material.

Importers of pig iron are more optimistic as to the possibility of selling foreign iron to consumers near the Atlantic coast. A dealer in Philadelphia is reported to have purchased a small tonnage of high phosphorus foundry iron of Continental origin. Offers are being made in practically all cases in pounds sterling. A recent offer of a low phosphorus foundry iron with silicon 2.50 to 3 per cent would have enabled the importer to sell at \$26 per ton delivered to consumers' works in the New England district, in competition with a price on domestic iron of about \$26.65 per ton delivered. While some business might be closed at this price, as a rule, consumers purchasing foreign iron expect to save close to a dollar per ton as compensation for investing their money in a fair-sized tonnage and storing the iron that purchased from domestic sources would be delivered a few carloads at a time. Some sales are reported to have been made in foreign pig iron during the past few days.

## STEEL AND IRON EXPORTS IN 1923

### Over Half the Year's Shipments Went to North American Markets, with Canada in the Lead

WASHINGTON, Feb. 12.—Over one-half of the iron and steel shipments of the United States for the entire year 1923 went to the main American markets, Canada, with 760,400 tons, being far in advance of any other export field, according to the iron and steel division of the Department of Commerce. Cuba was responsible for 171,900 tons, Mexico for 84,600 tons, Argentina for 53,700 tons, Brazil for 50,500 tons, and Chile for 33,900 tons. The United Kingdom took 63,000 tons of iron and steel from producers in the United States. Exports to Japan increased heavily during the last quarter, due in part to needs for reconstruction after the earthquake. Japan's total for the year was 360,000 tons, of which 160,000 tons were shipped during October, November and December. Shipments to Australia, the Philippine Islands and China were 41,100 tons, 35,000 tons and 52,100 tons, respectively.

### Luxemburg Iron and Steel Conditions

LUXEMBURG, Jan. 24.—The hope of increasing production, thanks to larger supplies of coke, is checked by the disorganization of railroads in Belgium. The beginning of the actual crisis took place in the first days of January. The raw materials necessary for the good running of each day's work would sometimes be held up at stations or on shunt lines. The shipments of lime, for instance, were so deficient that some of the furnaces had to be blown out temporarily. While a slight improvement has occurred, the situation is far from being settled.

The disturbance in currencies has enforced hesitation in the working of plants, which have to purchase raw materials abroad, in Great Britain, notably. Buyers are holding back, due to the uncertainty of general politics in Europe. Inquiries are rather numerous but do not give rise to any fresh business. This will explain the downward tendency of the prices since the beginning of January. The Luxemburg ironmasters are in an awkward position and rather anxious for the future.

The following prices are recorded:

**Pig Iron.**—F.o.b., Antwerp, chill-cast No. 3 at 410 to 415 fr. and basic at 400 to 405 fr.

**Semi-Finished Steel.**—Germany has placed numerous orders in the plants here, and prices are consequently firmer.

**Rolled Products.**—Joists, 620 fr., or £6 2s. 6d.; bars, 640 fr., f.o.b., Antwerp.

Exhibits of oil burners and oil-burning equipment will be shown at the annual meeting of the American Association of Oil Burner Manufacturers to be held at the Hotel Chase, St. Louis, April 1, 2 and 3. Those who attend the meeting will fall into three general classifications: Industrial burner manufacturers, domestic burner manufacturers and distributors of both industrial and domestic burners and oil burning equipment.

## Future of General Commodity Prices

(Concluded from page 502)

during the war and post-war period was twisted and stretched beyond all recognition, and the checkered prosperity that has since existed has favored the industries whose commodities have had a high exchange valuation to the detriment of the commodities which have had a low exchange valuation. Good times are spotty, as a consequence, and will probably continue so until a balance, approximating the pre-war equilibrium, can be reestablished. The tendency, as shown by the spread between the maximum index and the minimum index of the various commodity groups reported by the Bureau of Labor, is toward its former balance. For example, in 1914 the range was 18 points, in 1917 it was 106 points, in 1922 some 101 points, and in 1923 about 94 points. A condition such as this would not appear in the country's markets as an avowed champion of a low price level. It works more subtly. It restricts fullest prosperity to a favored few, confines the greatest purchasing power to these selected classes, and by the repression of both earning and purchasing ability depresses prices.



## BOOK REVIEWS

**Mechanics of Machinery. Part I—Mechanisms.** By Robert C. H. Heck. Pages 508;  $5\frac{1}{4} \times 9$  in.; illustrations, 748; problems, 304. Published by the McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, \$5.

This is not merely a text book on kinematics, it is a valuable work of reference; the work of a man not merely with an amazing amount of academical information and data, shown by concrete illustrations, but with a wonderful gift of explanation that greatly enhances the value of the service rendered to engineers and other students of mechanics.

Some of the classifications are particularly happy—for instance, that under "Mechanics of Engineering." The distinction between machine and mechanism is made clear at the outset. The value of the illustrations is increased by the legends under them. The problems increase the value of the work as a text book. The frequent use of metric units will help our "thinking metrically." The author's views on belt thickness in connection with the design and of stepped (not "cone") pulleys are practical. His treatment of gear trains should prove a boon to the average machinist.

The concrete examples, being given under the name of the respective manufacturers of the mechanisms cited, adds to their interest and use. The book references under each main topic are given separately. For those not "well up" in mathematics, instructions are given as to the proper method of reading equations with subscript figures and Greek letters. The distinction between "helical" and "spiral" is clearly made. Both the Reuleaux and the Zeuner valve diagrams are given often; the Bilgram but once. Section 28: Principles of mechanism goes well into the subject. About all possible inversions of an engine mechanism are shown in Figs. 397 to 401 inclusive.

It would have been more interesting if the accounts of the machinery using non-circular gears had been mentioned. The omission of the Hindley worm gear is unfortunate. Calling a feather a spline (which latter is properly the groove in which the feather slides) is incorrect. About the only method of transmission not mentioned is that proposed for some automobiles—the hydraulic, permitting easy reversal and obviating noise. Clutches do not necessarily connect only parallel shafts. The well-known system of compressing pumps by which a piston pump is automatically changed to the plunger type at any desired point would have been well worth mentioning, as it is used in briquette manufacture.

These remarks as to errors of omission and commission must not be considered as hypercritical; they should rather, by showing that the reviewer has gone over the book carefully, indicate his high appreciation of its many merits.

R. G.

**Wealth and Income of the American People.** Second Edition. By Dr. Walter Renton Ingalls, director of the American Bureau of Metal Statistics, formerly editor of the *Engineering and Mining Journal*. Pages, xviii + 372,  $5\frac{1}{4} \times 8\frac{1}{2}$  in. Published by G. H. Merlin Co., York, Pa. Price, \$3.50.

In reviewing the first edition of Dr. Ingalls's book (IRON AGE, March 16, 1922) we referred to the service the author had done in showing the fallacy of the view that the United States profited by the war. Particularly prevalent was the idea that many corporations waxed rich on war work. The fact was that the Government took in taxes a large percentage of the profits of that period and much of the remainder was represented in increased plant facilities and inventory, the former of which was plain overbuilding in many cases, while the latter suffered disastrous shrinkages in value in 1920 and 1921. In showing the mistakes of the common thinking about the economic effects of the war the author had pointed the way to the securing of the largest measure of material well being in the years of

readjustment. He had predicted also that non-agricultural labor, which in the last two years of the war and those immediately following had been able to take for itself as high as 80 per cent of the produce of industry, would be obliged to go back to 75 or possibly 70 per cent.

In this second edition of his book Dr. Ingalls has three new chapters, these dealing with "The Economic Position of America at the End of 1922," "Taxation and the Expense of Government" and "European Conditions." Some later data have been added to the original tables and there is a new 10-page appendix giving later fiscal and other economic information bearing on statements in the first edition.

While some of the developments in American business in 1922 did not bear out the views expressed in the first book—those on the outlook in the automobile industry for example—the author finds no reason to revise his general estimate of the economic consequences of the war and his opinions as to the road that must be traveled if there is to be real recuperation. The thought recurs in the new matter written for the second edition that while some expected consequences of the war have been postponed they are not to be avoided. Of the industrial taxation, railroad, agricultural and other problems now before the American people it is said:

"The only permanent solution is increased production and increased saving, which are going to be the result of more work and less amusement. In the course of time the American people will learn that good railroad service is more important than unlimited automobiles and that houses are really more desirable than garages."

There is a disposition to label as pessimism, and thus in a measure to discredit, comment on present economic maladjustments that takes the view that the country cannot have real prosperity without a recovery in morale and a giving up of the false economic ideas that got such an impulse from the war. But such treatment will not dispose of the very real issues with which the book before us deals. Dr. Ingalls's thinking and his cogent putting of his thought make his book a distinct contribution to the solution of these problems. He has done a service in his work on the difficult matter of valuations of the various forms of wealth—a study that is highly important in determining to what extent, if at all, the American people have impaired their principal by what has been permitted to happen in respect to production and the scale of living in the years since the war.

The book should have the careful reading of industrial leaders, engineers, economists, legislators—of all who would help in the greatest task, materially speaking, that is before us—the restoration of our industrial equilibrium.

The National Association of Office Managers which held a meeting in Detroit in the summer of 1923 has compiled the proceedings in a pamphlet of 121 pages, for sale at \$2 a copy. The proceedings cover a number of papers on various features of office management. Included is a contribution on the bonus plan of the Graton & Knight Mfg. Co., by F. E. Barth; one on helping schools to help industries, by F. P. Hamon, of the B. F. Goodrich Co., and one on constructive enforcement of discipline, by A. A. Keiser, of the National Cash Register Co. The proceedings may be obtained from T. G. Woolford, secretary to the association, Retail Credit Co., Inc., Atlanta, Ga.

The Columbia Steel & Shafting Co., Pittsburgh, has been sending out a little volume reprinting editorial utterances of Gabriel Heatter. These deal in a very apt way with a number of topics that relate to business life and to life that is not business. A few of the titles are "Salesman A and Salesman B," "There Must Be a Way Out," "Every Man Makes His Will," "What Is It Your Eyes See?" "How Do You Stand With Yourself?" "In the Land of the Unconquerables."

# Would Test Rights of Trade Associations

Highest Court May Be Called Upon to Decide in Regard to  
an Organization Having an Unquestioned Record  
—Various Opinions Advanced

BY L. W. MOFFETT

WASHINGTON, Feb. 12.—The question of trade associations and their rights will not down. It is expected to continue bobbing up until it has been made much clearer than it is at present. Despite court decisions, and the vast amount of discussion and correspondence on the subject during the past few years, the problem is as complicated, if not more so, than it was at the outset. It has progressively taken on more interest as the work has developed, and its value has been appreciated by the business interests of the country. The growth of the work has been especially marked since the advent into office of Secretary of Commerce Hoover. He has repeatedly stressed the vital importance, more particularly to small business interests, of the compilation and distribution of what he considered legitimate statistics by trade associations. To this end he has brought about widespread cooperation from trade associations throughout the country with the Department of Commerce, and this, in turn, has encouraged greatly increased activities of trade association work generally. It has impressed upon the minds of business people the necessity of having accurate information as to such matters as production, stocks, shipments, consumption, and a range of prices on closed transactions, if they are to operate intelligently.

## Effects of the Daugherty Statement

There can be no doubt that it is the best legal thought that trade associations may safely compile statistics of this character and distribute them among their members either with or without cooperating with the departments of the Government. The fact remains, however, that the latest statement of Attorney-General Harry M. Daugherty to Secretary Hoover has created considerable apprehension among business interests and trade associations. It does not change the situation merely to declare that the statement of Attorney-General Daugherty does not have the force of law and that it assumes legislative rather than judicial expression. The fact remains that it has caused some trade associations to give up their work. This is the really serious phase of the Daugherty statement. Because of this there is a growing desire that action be taken on the suggestion to have a test case expedited through the Supreme Court of the United States, so that a clear and definite legal code covering trade association work would be available. In order to do this, the proposal has been made that the test case involve some trade association engaged in general and useful statistical work. It is maintained that this would be an ideal test rather than to rely upon the outcome of pending cases where action has been brought by the Government against trade associations because of alleged violations of the Sherman anti-trust act.

Such a course, it is confidently believed, would show that the statement of the Attorney-General, which he claims to be based on court action as well as the decree in the Tile Manufacturers' Credit Association, is erroneously conceived.

## Mr. Compton's Letter

Wilson Compton, secretary-manager of the National Lumber Manufacturers' Association, in a letter to Solicitor Stephen B. Davis of the Department of Commerce, has presented his interpretation of the informal opinion of the Attorney-General and expressed the hope to the solicitor that the latter's analysis of the situation "may be such as to confirm a continuance of the department's policy of constructive cooperation with

trade associations." Mr. Compton puts a construction on the opinion of the Attorney-General that is at variance with the general view, probably including that of the Department of Commerce.

Mr. Compton holds that the statement of the Attorney-General discloses no declaration "either directly or by necessary implication of opinion that the compilation by associations of trade statistics and distribution and publication of 'general information as to the condition of an industry, such as the total production, shipment, stocks on hand, and the average price, or range of price' is per se an unlawful act."

It is Mr. Compton's contention that the law is sufficiently clear to provide "a reasonably reliable guide to the conduct of associations, in good faith, desiring to do constructive service and to obey, not evade the law."

Among others, however, who have analyzed the opinion of the Attorney-General, it is construed as meaning that the information, as Mr. Daugherty himself said, "should be distributed strictly through a responsible medium like your department; and I see no objection to its being gathered by an association, provided it be strictly guarded and the association be prohibited from distributing it among its membership."

Mr. Daugherty had previously mentioned a general line of information, although Mr. Compton says the Attorney-General draws a sharp distinction between two sorts of information, first, the general compiled information descriptive of the industry's condition, and second, the intimate details descriptive of the condition of the business of each competitor individually.

## No Early Announcement Expected

It is not believed that the Secretary and Solicitor of the Department of Commerce will for the present, at least, make any announcement on the subject. It is understood, however, to be the view of Government officials interested in the continuation of trade association work that this is necessary for many reasons, the outstanding one of which is to enable American business to be conducted along intelligent lines, and it is further felt that trade associations bridge the gap between extreme individualism and collective action. Furthermore, it is felt that they promote fair treatment, eliminating bad competition and stimulating good competition. It is not believed by these sources that decisions of the courts on trade associations were based on the intent of the Sherman law, which was meant for the public welfare. It has been pointed out that trade associations were not consequential when the Sherman act was framed and that it was directed against collective capital, whereas trade associations do not imply a combination against public welfare, but rather are an aid to it.

## Legislation May Be Needed

There are Government officials, who, embracing these views, think that legislation is necessary to clear up the status of trade association work. It is believed that business interests generally might be opposed to legislation. At the outset, it is pointed out that Congress, realizing that the country is on the eve of the political campaign, is unusually active in business baiting and perhaps would use the trade association subject as a source of agitation in this direction. Moreover, when the attempt was made at the previous Congress to enact trade association legislation, many business interests which had originally favored it subsequently opposed it because of the knowledge that the authority



proposed was to be given to the Federal Trade Commission. The present thought in the minds of those who think legislation is necessary, but not at this session of Congress, is along the general lines of that previously proposed and which would advise trade associations in advance, after filing charters, whether or not their work would be legal. The present plan, however, would go a little further and would call upon a trade association to make it clear whether or not it would be for the public welfare. Once established that this was its purpose, a charter would be issued. Complaint for supposed violations could be filed against trade associations and if the resulting hearing developed the fact that they were operating against the public welfare, a cease and desist order would be issued. Should such associations continue in the face of this order, prosecution would follow. But, in the event the trade association showed that it had been unjustly prosecuted, it would be given the right to sue the United States Government for the action against it, and also

for the right to go into court to establish the point in the case of a stop order. While this proposal has been given some consideration, its enactment into law seems to be remote, to say the least.

#### Work by the Government

An alternative, some officials think, would be for the Government to take up the work of trade associations, and, if necessary, through a form of compulsion. This view is held because of the realization of the vital importance of business information such as that compiled by trade associations. However, those holding this view would dislike extremely to see the point reached where such compulsion would be necessary.

Whatever the value of these proposals may be, it still seems to be the general view that the most satisfying course would be to develop the test case involving some important trade association against which no charge has been brought, and which has been involved in no litigation.

## REPUBLIC EARNINGS

### Handsome Increase Compared with Preceding Year—Production Satisfactory

Profits of the Republic Iron & Steel Co. for 1923 amounted to \$9,267,796, compared with \$2,520,862 in 1922. Net profits available for dividends was \$6,252,218, which, after paying the regular 7 per cent dividends on the preferred stock, was equal to \$15 a share on the \$30,000,000 common. This compared with \$1.68 a share earned on the preferred in 1922 and a deficit of \$5,281,684 in 1921.

In addition to the regular dividends paid on the preferred last year the company paid an additional 6 per cent on account of back dividends, making the total paid \$3,250,000. The amount carried to surplus at the end of the year was \$3,002,218.

The total volume of business done by the company last year was \$59,043,130, compared with \$39,123,708 in the preceding year. Unfilled orders on hand Dec. 31, totaled 141,911 tons, against 219,948 tons on Dec. 31, 1922.

A comparative income account for years 1920-23 appears below.

	1923	1922	1921	1920
Net earn.....	\$8,600,792	\$2,189,408	\$511,528	\$13,825,521
Other income..	667,004	331,454	173,482	548,642
Total inc....	\$9,267,796	\$2,520,862	\$685,010	\$14,174,163
Depreciation ..	\$1,404,579	\$1,002,373	\$1,026,874	\$1,506,260
Idle plant exp. ....			1,494,130	
Mine exhaus..	384,359	222,810	159,797	508,062
Fed. tax, etc....				1,812,835
Lib. b'd loss.....			383,558	
Inv. reduct'n.....			2,478,918	1,992,517
Int. & disc't....	1,226,640	877,367	806,975	737,967
Net profit...	\$6,252,218	\$418,312	\$5,665,242	\$7,616,522
Prefer'd div....	\$3,250,000		\$1,750,000	\$1,750,000
Common div....			450,000	1,800,000
Surplus ....	\$3,002,218	\$418,312	\$3,865,242	\$4,066,522
Prev. surp....	\$30,001,617	\$29,576,329	\$37,441,571	\$33,880,972
Total sur....	\$33,003,835	\$29,994,641	\$29,576,329	\$37,947,494
Written off....				\$505,923
P & L sur....	\$33,003,835	\$29,994,641	\$29,576,329	\$37,441,571

\*Thirteen per cent dividends, including 6 per cent on account of back dividends.

†Loss.

‡For 1917 taxes.

§After credit adjustment of \$6,976.

Current assets Dec. 31 were \$30,175,440 and current liabilities, \$4,754,927, making working capital \$25,420,513, against \$16,156,771 at the close of 1922, and \$15,180,064 at the close of 1921. Holdings of cash and Government securities were \$8,439,256, against \$1,760,440 a year previous. Inventories were \$14,683,088 against \$13,831,185. Gross business for 1923 was \$59,043,131, against \$39,123,708 in 1922, and \$20,756,748 in 1921.

During 1923 \$3,208,173 was spent for construction and property additions against \$357,095 in 1922. Total expenditures of this nature to end of 1923 were \$52,

119,592. During the year \$42,325 in property was sold.

A summary of production for 1923, with comparisons, follows:

	1923	1922	1921
Gross Tons			
Iron ore .....	1,519,348	969,669	299,319
*Coal .....	2,474,793	1,555,313	1,052,615
*Coke .....	803,873	606,191	337,671
Pig iron .....	992,033	632,498	301,080
Bessemer steel ingots.....	356,919	122,013	122,068
Open hearth steel ingots...	658,573	609,535	207,710
Total steel ingots.....	1,015,492	731,548	329,778
*Fin. and semi-fin. prod....	971,116	733,496	336,746

\*Net tons.

Shipments for the year included 706,195 tons of finished product, 173,885 tons semi-finished and 218,711 tons of pig iron, a total of 1,098,791 against 901,760 tons in 1922 and 376,632 in 1921.

Iron ore reserves at end of 1923 are estimated at 117,316,967 tons, against 125,733,829 a year before. Coal reserves are estimated at 128,407,495 tons against 132,437,601 tons at the end of 1922.

Chairman John A. Topping in his report said: "The improved demand for iron and steel was on a rising scale for the first quarter of 1923, March sales in excess of any other month in our history. Following this period of activity and of rising prices, a general market reaction occurred, under which influence stocks of iron and steel were liquidated and purchases restricted to the barest necessities. This condition continued throughout the last half of the year, but owing to heavy bookings in the early part of the year, production for the year was on a satisfactory basis."

### Sales Executives Join Management Group

The National Association of Sales Managers was consolidated Feb. 7 with the sales executives' division of the American Management Association. In making the announcement C. K. Woodbridge, president Dictaphone Corporation, and president of the sales association, stated: "I believe that business men will appreciate the wisdom of this move, which immediately associates the members of the National Association of Sales Managers with leadership which embraces all factors of business. It opens up an opportunity for organized sales management to cooperate with other factors in business administration."

An open competitive examination for junior geologist will be held throughout the country on March 26 and 27 to fill vacancies in the Geological Survey, Department of the Interior. There is also to be an examination for junior engineer and deck officer, applications closing June 30, to fill vacancies in the Coast and Geodetic Survey. Application blanks may be obtained from the United States Civil Service Commission, Washington, D. C.

## Plans of New Companies

The American Wireless Corporation, 54 West Twenty-third Street, New York, has been incorporated with \$20,000 capital stock and will act as distributor of popular makes of wireless instruments and parts. The organizers were previously engaged in a similar business, known as the National Radio Corporation. Incorporators are L. H. Baer, E. I. Wechsler and H. Z. Wang.

The Terminal Steel Supply Co., 50 Church Street, New York, has been incorporated with \$25,000 capital stock, to operate as jobber in iron and steel products. C. L. Altemus, who heads the company, was formerly connected with the Cambria Steel Co. Mr. Altemus, F. H. Niles and C. H. Lawson are the incorporators.

H. J. Woltman & Co., Inc., 114 Liberty Street, New York, recently incorporated with \$30,000 capital stock to manufacture machinery and parts, will confine present activities to buying and selling power house machinery and kindred lines. No manufacturing will be undertaken. Mr. Woltman, F. McGovern and C. C. Shultz are the incorporators.

The Consolidated Radio Service Corporation, 401 East Fourteenth Street, New York, has been incorporated with \$25,000 capital stock, to deal in radio devices and equipment. Initial business will be conducted on a limited scale. Address in care of K. M. Marcus, 131 Park Row, New York.

The Krajewski-Pesant Mfg. Corporation, 223 Fulton Street, New York, has been incorporated with \$25,000 capital stock, to manufacture engines and other steam power equipment. Plans are as yet undetermined, awaiting the completion of organization matters. E. H. Stanton, R. P. Buell and J. B. Knox are the principals.

The Swordloff Brothers Co., 149 Seventh Avenue, New York, has been incorporated with \$20,000 capital stock, to conduct a business as dealers in scrap iron and other metal. It has a small yard and limited facilities. S. D. Swordloff is one of the heads.

The Raflex Mfg. Sales Co., 1328 Broadway, New York, has been organized to act as distributor of wireless equipment. David Levow heads the company.

The Air Line Radion Equipment Corporation, 15 East Fourteenth Street, New York, recently incorporated with \$50,000 capital stock to manufacture radio equipment, has no definite plans for operation and nothing will be done in this direction for some time. S. Cohen, E. Sachs and C. S. Rich are the principals.

The Frank Radio Corporation, 59 Cortlandt Street, New York, has been incorporated with capital stock of \$50,000 to act as distributor of wireless equipment and kindred lines. J. M. Donegan, R. Snow and M. V. Krees are the incorporators.

The Diesel Engine Co., Stamford, Conn., has been incorporated with \$10,000 capital stock as a consolidation of the Mianus Motor Works, Inc., and the Mianus Diesel Engine Co.

The Andrew Kopperud Co., 3801-11 Lapham Street, Milwaukee, has been incorporated to manufacture steel and malleable forging tools and like products, having taken over an established business in this line.

The E. L. Miller Mfg. Co., 22 West Third Street, Kansas City, Mo., has been organized to manufacture oil burners, water filters and concrete fence post molds. The company has a three-story factory and sufficient equipment for present needs. E. L. Miller is president.

Squier, Schilling & Skiff, 357 Washington Street, Newark, N. J., has been organized to handle hardware and mill supplies, covering Newark and surrounding towns. O. R. Schilling is president, Arthur H. Squier is treasurer and Samuel Skiff, vice-president and secretary.

The Thorpknit Mfg. Co., Germantown, Philadelphia, has been organized to manufacture knitting machines. The company will lease property at Lena and Armat Streets, and will begin in a small way. Most of its work will be done under contract, at least temporarily. R. A. Luken is treasurer.

The Union Vault & Safe Co., in care of John T. Fay, 35 Congress Street, Boston, has been organized as a subsidiary of the Diebold Safe & Lock Co.

The Industrial Gas Equipment Co., 598 State Street, New Haven, Conn., has been organized with \$100,000 capital stock to manufacture Reeves gas-air pre-mixers, inspirators and other burner devices. It has purchased manufacturing rights of the Reeves Mfg. Co., Milford, Conn., and has leased manufacturing space. Necessary equip-

ment has been provided. The officers of the company are Anthony J. Verdi, president; Vincent Carangelo, vice-president; Charles Oppe, treasurer; F. I. Newton, secretary.

Deline & Elmes, 25 Church Street, New York, have organized to deal in general contractors' supplies and hoisting equipment. Mr. Deline was at one time chief engineer for the National Hoisting Engine Co., Harrison, N. J.

The Ever-Clean Spark Plug Co., 349 West Forty-seventh Street, New York, has been incorporated with capital stock of \$25,000 to manufacture spark plugs and kindred products, its business being conducted on a small scale. D. N. Napoli and M. Sabatino are the principals.

The Republic Gear Co., 1535 Temple Avenue, Detroit, recently organized to manufacture gears, is having manufacturing done by contract and plans to establish branches throughout the country. Warehouse facilities will be maintained at Detroit. H. N. Nigg, president and treasurer of the company, was formerly vice-president and general manager of the Detroit Bevel Gear Co., and also manager of the Frost Gear & Forge Co., Jackson, Mich. J. S. Dages, vice-president and secretary, was formerly assistant sales manager of the Warner Gear Co., and general branch manager of the American Gear Co., Jackson, Mich. W. W. Spurgeon, formerly with the Muncie Gear Co., Muncie, Ind., and western branch manager of the American Gear Co., together with F. D. Johnson, formerly of the Warner Gear Co., Muncie, Ind., are also connected with the company.

The Yerkes Tool Co., 433 Arch Street, Philadelphia, has been organized to act as wholesaler and jobber in tools serving principally the machine shop and factory trade. The company will buy and sell small tools of all kinds and is now carrying a good-size stock. The management is interested in securing the exclusive sale of any kind of tool specialties. George H. Yerkes is president and Clarence T. Yerkes, secretary-treasurer.

The Kernerator Co., 1029 Chestnut Street, Milwaukee, has been organized with \$100,000 capital stock and will act as a sales organization for the Kerner Incinerator Co. Mackey Wells is president and treasurer, and R. E. Dean is vice-president. F. L. Sivy, president Northwestern Malleable Iron Co., is one of the directors.

Libby & Meloy have been organized as industrial counselors at Southern Building, Washington, to conduct investigation of various phases of industry, which involves economics and engineering, resulting from litigation and legislative committee hearings. John H. Libby prepared statistical and economic studies for the United States Coal Commission through the Bituminous Operators' Special Committee. Thomas K. Meloy is a graduate of Massachusetts Institute of Technology, class of 1917, and was for two years assistant to Dr. J. A. L. Waddell, bridge engineer, who was at that time technical advisor to the Chinese Railway Administration. The new firm will have a branch office at 61 Broadway, New York.

The Gas Producer Corporation has been incorporated under Delaware laws, with capital stock of \$6,000,000, for the purpose of selling and installing water gas producers for heating and power purposes. The company has a device for using oil and water as a fuel. All manufacturing will be done under contract by large production foundries and screw machine factories. Temporary address is in care of E. C. Horwett, Graves Securities, 17 East Forty-second Street, New York.

Lee Oil Grate, Inc., 81 Godwin Street, Paterson, N. J., has been incorporated with \$250,000 capital stock to manufacture gravity feed oil burners for domestic use. Method of manufacture and requirements for equipment have not been decided. The officers of the company are August Wassmann, Jr., president; George Radfor, vice-president; T. F. Lee, treasurer, and E. M. Wassmann, secretary.

The newly organized Ingot Iron Railway Products Co., 1318 Peoples Gas Building, Chicago, will promote the sales of Armco corrugated metal culverts in the railway field.

The Maple Hill Slate Co., Allentown, Pa., has been organized by Benjamin F. Hofelich, William J. Harding and William Faulk and plan to mine and finish plate products. Some machinery will be required later.

The Smith & Hull Co., Warsaw, Ind., has purchased the plant and properties of the bankrupt Laco Mfg. Co., a subsidiary of the Hugro Mfg. Co., Warsaw. The new owners plan to put the plant in shape for operation.

J. J. Gray, Jr., Columbia, Tenn., manufacturer of ferro-phosphate iron for several years at Rockdale, Tenn., has incorporated a company with capital stock of \$250,000. Other members of the organization are D. R. Gray, John S. Glenn, John Walton and G. T. Tughe, Jr. It is planned to operate blast furnaces for the manufacture of ferro-phosphorus pig iron products.

The Liquidometer Co., 250 West Fifty-seventh Street, New York, has been incorporated with \$1,025,000 capital



stock, under Delaware laws, and will manufacture precision gages. It appears likely that manufacturing will be done in New York, but negotiations are not yet completed. M. C. Lachenbruch is secretary and treasurer.

The Westco Chippewa Pump Co., recently incorporated in Illinois with headquarters at Moline, is a consolidation of the Western Pump Co., Davenport, Iowa, and the Chippewa Pump Co., Chippewa Falls, Wis., which the Western company recently purchased. Included in the holdings of the new company are the Western Foundry & Machine Co., Moline, Ill., previously owned by the Western Pump Co. Officers are J. W. Bettendorf, Davenport, president; and C. S. Humphrey, Rock Island, Ill., secretary. D. W. Grafson, Moline, is manager of the Moline plant.

### Trade Changes

Pitts & Kitts Mfg. & Supply Co., 342 Madison Avenue, New York, has been designated as representative in the adjacent territory for the Glauber Brass Mfg. Co., Cleveland, manufacturer of plumbing supplies. H. J. Ross will supervise the department handling Glauber supplies.

The Birmingham, Ala., office of the Sullivan Machinery Co., Chicago, has been moved to 2108 Fifth Avenue North. G. P. Small is manager.

The U. T. Hungerford Brass & Copper Co., New York, has opened a new branch warehouse at 3035 St. Clair Avenue, Cleveland.

The Heine Boller Co., St. Louis, has appointed the Tennant Co., with offices in the Union National Bank Building, Houston, Tex., as representative in the territory comprising the southern half of Texas. J. A. Tennant is in charge of the office. Smith & Whitney, Dallas, Tex., are representatives in the northern half of Texas.

Warren Webster & Co., Camden, N. J., manufacturers of steam heating equipment, feed-water heaters, etc., have moved into a new plant at Federal and Seventeenth Streets, Camden.

The Cleveland Crane & Engineering Co., Wyckliffe, Ohio, has appointed C. F. Hutchings, 222 Market Street, Newark, N. J., distributor of Cleveland tramrail equipment in northern New Jersey.

The Ingalls Iron Works Co., Birmingham, Ala., steel fabricating, announces installation of warehouse service. The plant is working on full time, and occasionally night and day, with numerous orders in hand.

Brace-Mueller-Huntley, Inc., with offices at Ellicott Square, Buffalo, and Seitz Building, Syracuse, N. Y., has been appointed district sales manager for the Falcon Steel Co., Niles, Ohio, as well as the Falcon Tin Plate Co., in western New York.

W. H. Daub & Co., Inc., engineers, have changed address from 31 Nassau Street, New York, to Alaska Building, Seattle, Wash.

Henry Potts & Co., dealers in iron and steel, will move on March 1 from the Real Estate Trust Building to new offices at 1608-10 Bankers Trust Building, Philadelphia.

The Detroit Electric Furnace Co., Detroit, has changed its address from 642 Book Building to 2331 First National Bank Building.

The Midwest Piping & Supply Co., St. Louis, has opened New York offices at 53 Park Place.

The Charles Bond Co., 617 Arch Street, Philadelphia, agent in that city for the past 25 years for the Cumberland Steel Co., Cumberland, Md., manufacturer of turned, ground and polished shafting, has been appointed selling agent for eastern Pennsylvania, Delaware and the southern half of New Jersey as well as Philadelphia. The company maintains a warehouse in Philadelphia.

The Parsons Machinery Co., Marlboro, Mass., leather working machinery, plans to discontinue the operation of its foundry. Its machine shop will be retained under the present management.

The Rockford Lathe & Drill Co. and the National Lock Co., both of Rockford, Ill., have been merged under a new corporate name of the National Lock Co. of Delaware.

The Dayton-Dowd Co., manufacturers of centrifugal pumps, Quincy, Ill., has opened consolidated sales offices at 30 North Michigan Avenue, Chicago.

The Reinforced Switch & Mfg. Co., 400 East North Avenue, Pittsburgh, has appointed Edwin Elliott & Co. as sales representatives for eastern Pennsylvania, southern New Jersey and Delaware.

The Washington-Dean Co., Inc., 8-10 Bridge Street, New York, announces the opening of a Chinese department under the management of R. W. Fuller. The department will conduct a general export and import business with the Far

East, continuing the business previously conducted by Arnold, Dorr & Co.

The Chicago offices of the Townsend Co., manufacturer of rivets, wire nails, and wire, New Brighton, Pa., have been moved to the London Guarantee & Accident Building, 360 North Michigan Boulevard. J. C. W. Daly is branch manager.

The name of the Columbus Handle & Tool Co., Columbus, Ohio, has been changed to the Columbus Handle & Tool Corporation. The company will continue without further changes the manufacture of farming tool handles, linemen's construction, logging and ice tools.

The Dalton Malleable Castings Co., Warsaw, Ind., has increased its capital from \$350,000 to \$450,000 to facilitate the purchase of the Dalton Foundry, manufacturer of gray iron castings, and the Sutherland Mfg. Co., manufacturer of automobile accessories. D. J. Dalton, president of the Castings company, has held controlling interests in both companies for some time and the merger was effected in order to use the properties to the advantage of heavier production for the malleable iron foundry and the possible removal of the accessories department to another location. The name will soon be changed to the Dalton Foundries, Inc.

The John Wood Mfg. Co., Conshohocken, Pa., has purchased the range boiler plant and business of the Wolff Mfg. Co., Chicago, to take care of western business. David Ramsey, Jr., treasurer of the Wood company, has been made general manager of the acquired plant.

The B. C. Ames Co., Waltham, Mass., has appointed John Cetrule of the Triplex Machine Tool Co., 50 Church Street, New York, as district sales manager, in charge of the New York office, which covers New Jersey and Eastern New York. A full line of Ames equipment will be carried in stock.

The Hanna Engineering Works, 1765 Elston Avenue, Chicago, manufacturer and distributor of Hanna riveting machines, air hoists, sand sifters and I-beam trolleys, is now represented in Richmond, Va., and surrounding territory by Walter F. Delaney, 203 Mutual Building.

The Manganese Steel Forge Co., Philadelphia, has moved its offices from 1523 Real Estate Trust Building to Richmond Street and Erie Avenue.

The Sharp Tool & Supply Co., Inc., Buffalo, has been purchased by the W. A. Jones Foundry & Machine Co. of Chicago. No changes in the management are contemplated, and the present organization will continue to act as the Buffalo branch in charge of sales and engineering for western and central New York, carrying a complete warehouse stock at Buffalo.

Harvey H. Brown & Co. and the Stewart Furnace Co., Cleveland, announce the removal of offices from 1335 Rockefeller Building to 1854 Union Trust Building.

McClellan & Junkersfeld, Inc., engineering and construction, have moved the home office to 68 Trinity Place, New York.

The Standard Turbine Corporation, Scio, N. Y., manufacturer of steam turbines, announces the opening of a San Francisco office, the representatives in that city being Halloran & Golcher, a firm long established in turbine sales and engineering. The Turbine corporation has also opened an Omaha office, with the Industrial Sales & Engineering Co. as representative.

The Shepard Electric Crane & Hoist Co., 30 Church Street, New York, has opened an office in Detroit, at 5-124 General Motors Building. J. D. Gillette is district manager, and he is assisted by Harold Aber.

Manning, Maxwell & Moore, Inc., announce the consolidation of the Cincinnati and Cleveland offices. E. H. Merrick will be manager of the combined offices, with headquarters in the Huron-Sixth Building, Cleveland. Territory of this office embraces Ohio, Indiana, Kentucky and Tennessee.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of excavators, cranes and machine tools, has opened new offices in the South as follows: N. B. Norris, formerly district manager at New Orleans, is now district manager of the Memphis, Tenn. office; D. J. Murphy, formerly at the New Orleans office, becomes manager of the Texas district with headquarters at Dallas; W. J. Dugan, as southern sales manager, will assume charge of the entire southern territory with headquarters at Memphis, where a complete stock of excavator renewal parts will be maintained.

The Reading Iron Co. has moved its Pittsburgh district office, F. M. English, district manager, from 1505 to 1302 First National Bank Building.

The W. W. Sly Mfg. Co., 4700 Train Avenue, Cleveland, manufacturer of sand blast machinery and foundry equipment, has secured the services of the P. H. McArdie Equipment Co., New Orleans, as representatives for Texas, Louisiana, Mississippi and Florida.

The Kidwell Boiler Co., Milwaukee, has moved its offices to Room 813, 238 East Water Street.

The Bridgeport Brass Co., Bridgeport, Conn., has moved its Philadelphia office from the North American Building to the Bankers Trust Building.

The Engineering & Equipment Co., Commercial Trust Building, Philadelphia, has changed its name to the Machine Tool Sales Co.

The Cleveland district sales office of the Sharon Steel Hoop Co. has been moved to 914 Union Trust Building, East Ninth Street and Euclid Avenue. G. A. Singer is district manager.

The Electric Steel Co., 3100 South Wood Street, Chicago, steel and special alloy castings, has changed its name to the Nugent Steel Castings Co.

### Industrial News Notes

Optimism for 1924 was the unanimous feeling at the annual sales conference of the Abrasive Co., Philadelphia, which was recently held. Representatives were present from all of the territorial offices of the company, including Frank G. Dowling of San Francisco. The company's business in 1923 was declared to be gratifying, while 1924 opens with every indication of sustained activity. No changes were made in the territorial offices. The conference, which was attended by over 30 representatives of the company, was concluded with a dinner to the visiting salesmen and company officials at the Manufacturers' Club. The Abrasive Co. in addition to its Bridgeburg plant operates the Abrasive Co. of Canada, Ltd., at Hamilton, Ont., in connection with the manufacture of grinding wheels and polishing grain.

The Government has been granted permission to sell the plant of the Groton Iron Works, Groton, Conn., which was placed in the hands of a receiver in December, 1921, with liabilities of more than \$4,000,000.

The Atlas Tack Co., Fairhaven, Mass., has placed in operation its new branch plant at St. Louis. Initial production actually started in September, last year, but not until last week were final details of production completed. The company's Cleveland plant has been abandoned. The St. Louis plant will employ approximately 300 workers.

The Rigby Valve & Machine Co.'s plant at Sharon, Pa., owned by Patrick Wilson and Hugh Stewart, is being dismantled and the machinery sold.

The Indestructible Wheel Works, Lebanon, Ind., has completed the new warehouse made necessary by the rapid expansion of business. This addition increases its total floor space to 27,000 sq. ft.

Orders received by the General Electric Co. during 1923 amounted to \$304,199,746, against \$242,739,527 for 1922, or a gain of 25 per cent., according to an announcement by President Gerard Swope.

Lewis McNutt was elected president of the Brazil Machine & Foundry Co., Brazil, Ind., at a recent meeting of the stockholders. James Evans was elected vice-president and James W. McNutt, secretary-treasurer. Directors are James Evans, Lewis McNutt and James W. McNutt. Since the plant was rebuilt, following the disastrous fire in February, 1923, various improvements have been made in the machine shops and foundry section. The company reports that business is steadily increasing.

The Angle Steel Stool Co., Plainwell, Mich., at a meeting of stockholders soon to be held, will consider a proposal to build an extension to its factory. A new issue of stock will be offered for this purpose, \$10,000 of which has already been subscribed. C. E. Pipp is president.

The Amesbury Gas Co. has been sold to the Haverhill Gas Co., subsidiary of Stone & Webster, Inc., Boston, for \$109,500. Plans are under way to enlarge and extend the Haverhill plant to supply gas to several nearby towns. The Amesbury plant will be discontinued.

New officers of the Locomotive Crane Co. of America, Champaign, Ill., were recently elected as follows: President, H. E. Hughes, president Continental Bridge Co., Peotone, Ill.; vice-president, John Brenza; secretary-treasurer, J. G. Paddock, assistant credit manager, Illinois Steel Co., Chicago; plant manager, F. H. Ives.

Milton W. Arrowood has purchased all the interest held in his company by the Sanford Riley Stoker Co. The business known during the past year as the Ground Coal Engineering Corporation will now be operated by Mr. Arrowood and his associates in Chicago, who have been connected with the organization since its inception in 1917, at which time the original partnership was founded, known until incorporation in 1922, as the Ground Coal Engineering Co. The corporate name has now been changed to Universal Engineers, Inc., which is believed to be well suited for the company's pulverized fuel work, and at the same time more fitting for its general line of activities in conveying and handling materials, the success of its method in handling

pulverized fuel having led to expansion in other fields. Pending the establishment of offices in New York and Chicago, all correspondence should be addressed to the company under its new name at No. 2 Downing Street, Worcester, Mass.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, will make extensions and improvements in its power house at Marysville, Cal., to cost \$25,000. Extensions will also be made in the plant at Gridley, Cal., to cost a like amount. Additional equipment will be installed.

The Perfection Furniture Co., Riverside, Cal., recently organized to manufacture adjustable school desks and other specialties, has acquired property at Pachappa, and will have plans drawn for a new factory. L. P. Stewart is secretary and treasurer.

The J. R. Gardiner Co., Fullerton, Cal., manufacturer of farming and agricultural implements, has purchased property at West Commonwealth and West Santa Fe Avenues, and will have plans drawn for a new factory, one-story, 80 x 145 ft.

The Western Glass Co., Los Angeles, has awarded a general contract to the Union Iron Works, Los Angeles, for a new plant in the city industrial tract, Fullerton, Cal., including power house. It will cost approximately \$350,000, with machinery. D. W. French is superintendent in charge.

The Puget Sound Power & Light Co., Seattle, has plans under way for the construction of a hydroelectric generating plant on the Sultan River, Snohomish County, estimated to cost \$550,000, including transmission line. The company will also extend its White River hydroelectric generating station with the installation of a fourth generating unit of about 23,000 hp. capacity.

The American Railway Car Co., Tigard, Ore., has plans under way for the first unit of a local plant, one-story, 60 x 400 ft., for the manufacture of a special type of gasoline car to be used on railroad tracks. It will cost approximately \$60,000, with equipment.

Work will commence on a one-story machine shop, 50 x 150 ft., for the Marbelite Co., Long Beach, Cal., manufacturer of lighting standards, for which a general contract has been awarded to the Brombacher Iron Works, 1662 Long Beach Avenue.

### Acme Steel Has Good Year

The Acme Steel Goods Co., Chicago, made gross shipments in 1923 amounting to \$6,818,941, the heaviest in its history, as compared with \$4,232,010 for 1922 and \$2,408,627 for 1921. Gross sales for the year reached \$6,682,919 and net operating profit \$932,638. Adding other income and deducting bond interest and estimated Federal taxes, net income available for surplus was \$761,674, or the equivalent of \$15 per share. The statement of earnings for 1923 is as follows:

Sales .....	\$6,682,918.94
Less cash discount allowed.....	60,280.34
Net sales .....	\$6,622,638.60
Net operating profit.....	\$932,637.55
Other income .....	10,936.27
	\$943,573.82
Less bond interest and expense.....	71,900.00
Net income for the year.....	\$871,673.82
(Equals \$17.17 per share.)	
Estimated Federal tax.....	110,000.00
Net addition to surplus.....	\$761,673.82
(Equals \$15 per share.)	

### Inland Steel Co. Earnings

The Inland Steel Co. reports net earnings for 1923 of \$7,673,408. After allowing for all charges, including interest and Federal taxes, net profits amounted to \$5,274,958, against \$1,141,177 in 1922. Net profits for 1923 after allowing for dividends on the preferred stock were equal to \$4.01 per share earned on common stock. Directors declared the regular quarterly dividend of 62½c. per share on common stock and the quarterly dividend of \$1.75 per share on preferred. The common dividend is payable March 1 to stockholders of record Feb. 15, and the preferred is payable April 1, to holders of record March 15.

Thaddeus R. Baker, Indianapolis, treasurer W. J. Holliday & Co., wholesale jobbers in iron and steel, has been appointed receiver in Indiana for the National Motor Corporation by Judge A. B. Anderson of the Federal court. The corporation, which was placed in the hands of a receiver in Ohio a short time ago, has a plant in Indianapolis at 1004 East Twenty-second Street, which has been practically closed down for several months.



## STEEL AND INDUSTRIAL STOCKS

The range of prices in active steel and industrial stocks from Monday of last week to Monday of this week was as follows:

	Low	High		Low	High
Allis-Chalmers .. 48	50%		Int. Har..... 85	87½	
Allis-Chal. pf. ... 94%	96		Int. Har. pf. .... 107%	108	
Am. B. S. & F. pf. 80½	82		Jones & Laughlin		
American Can... 117½	121½		pf ..... 109%	110½	
Am. Can pf. .... 111%	112%		Lima Loco..... 67	68¾	
Am. Car & Fdry. 169	173		Midvale Steel... 33½	34½	
Am. Car & F. pf. 122½	122½		Nat.-Acme ..... 8½	9½	
American Loco... 73%	76%		Nat. En. & Stm. 38	42½	
Am. Loco. pf. .... 118%	118%		N. Y. Air Brake 42	42½	
Am. Radiator... 102½	105		Otis Steel ..... 10%	11½	
Am. Radiator pf. 122½	122½		Otis Steel pf. .... 64	65	
Am. Stl. Fdries. 38%	40		Pressed Stl. Car 56	61	
Am. Stl. Fd. pf. 104	104		Pressed Steel pf. 90	90	
Baldwin Loco... 124	131		Replogle Steel... 12½	13½	
Baldwin Loco pf. 114½	115		Republic ..... 58½	61½	
Bethlehem Steel. 59½	62½		Republic pf. .... 93½	94	
Beth. Stl. 7% pf. 95%	96%		Sloss-Sheffield .. 63½	67%	
Beth. Stl. 8% pf. 108%	109½		Sloss-Sheffield pf. 86½	86½	
Br. Em. Steel... 5	5		Steel of Canada. 77½	79%	
Br. Em. Stl. 2 pf. 14	14		Superior Steel... 33½	33½	
Chic. Pneu. Tool. 82½	82%		Transue-Wms. ... 33½	33½	
Chic. Fuel..... 26%	29%		Un. Alloy Steel.. 33½	36	
Crucible Steel... 68½	71%		U. S. Pipe..... 72	76%	
Crucible Steel pf. 91	91		U. S. Pipe pf. .... 86	86½	
Deere pf. .... 73	73		U. S. Steel..... 106%	109	
Gen. Electric... 210	218%		U. S. Steel pf. .... 119	120	
Gt. No. Ore Cert. 29%	31½		Vanadium Steel. 31	32%	
Gulf States Steel 86	89½		Whouse Air Br.. 94½	96½	
Inland ..... 37	38		Ygstown S. & T. 69	70½	

## Industrial Finance

As the result of the largest net sales for any year in its history, totaling \$698,000,000, net earnings for 1923 of the General Motors Corporation were \$61,825,000, after making allowance for depreciation and Federal taxes. This compares with sales of \$463,706,733 and net profit of \$51,496,136 in 1922.

Preliminary figures on earnings of the Otis Steel Co. for 1923 indicate operating profits of approximately \$2,100,000, and after deductions for bond interest and depreciation there is approximately \$1,500,000, equivalent to about two and one-half times the preferred dividend requirements. The corporation produced and sold 502,997 tons of steel products, nearly doubling the 1922 figure. The corporation owes its preferred stockholders about 17 per cent in accumulated dividends. New open-hearth furnaces, a blooming mill and a sheet bar mill, designed to facilitate material handling, are now in operation.

The Pressed Steel Car Co. reports total income of \$2,799,973 for 1923, against \$58,312 for 1922. After reserves for depreciation, maintenance and other charges, net income totaled \$1,706,861, against a deficit, of \$341,688 in 1922. After dividends on preferred stock, a balance of \$831,861 was shown, equivalent to \$6.65 a share on the \$12,500,000 common capital stock outstanding. In 1922 a deficit of \$1,216,688 was reported, after payment of preferred dividends.

Net profits in excess of \$7,000,000 after depreciation and taxes, are shown in the preliminary statement of earnings by Mack Trucks, Inc., for the year ended Dec. 31, 1923. This compared with net profits in 1922 of \$3,952,279. Last year's volume of sales was more than \$43,000,000, compared with \$31,070,000 in 1922, an increase of approximately 40 per cent.

The Cincinnati Screw Co., Twightwee, Ohio, has been placed in receiver's hands, Burton B. Robinson having been named. The receivership of the company is a preliminary step to a reorganization. Assets are given as \$151,000, and liabilities, \$90,000.

An illustration of the revival last year in the small tool business is found in the 1923 report of the Greenfield Tap & Die Corporation, Greenfield, Mass. Net profits were \$613,690, against \$159,183 in 1922. After deducting depreciation and preferred stock dividends, there remained the equivalent of \$1.59 a share on common stock, whereas in the two previous years there were deficits of \$152,286 and \$893,681, respectively. Current assets at the end of 1923 were \$4,435,615, current liabilities \$2,100,000 and net working capital \$2,235,615. At the close of 1922 current assets were \$5,002,854, liabilities \$2,600,000, and net working capital \$2,402,854. Profit and loss surplus as of Dec. 31, last, stood at \$452,415, compared with \$324,198 in 1922, and \$524,423 in 1921.

The Pittsburgh Steel Co., Pittsburgh, reports net profits for the six months ended Dec. 31, last, of \$892,771, against \$104,770 in the same period of 1922. Sales for the last half of 1923 were valued at \$11,489,562, against \$12,062,938 in the same period of 1922.

Last year was a prosperous one for the Trumbull Steel Co., Warren, Ohio, which reports net earnings of \$5,850,040, equal to approximately \$5 a share on 375,000 shares of outstanding stock. This compares with \$2.52 a share on 520,-

000 shares outstanding in 1922. The company added \$2,008,-942 to its surplus account, as against \$700,000 in 1922. Value of sales was \$31,205,614, as compared with \$23,163,726 in 1922. The company produced 254,202 gross tons of pig iron in 1923; 448,129 gross tons of ingots and 387,672 net tons of finished steel. Elimination of the 12-hr. day, the report stated, resulted in an increase of 7 per cent in the payroll. Retiring directors and officers have been reelected.

The Newton Steel Co., Newton Falls, Ohio, reports net earnings for 1923 of \$1,039,653, equal to approximately \$10.40 a share on the 100,000 shares of common stock outstanding. After deducting common dividends there remained a surplus of \$801,565, bringing total surplus as of Dec. 31, 1923, to \$937,494. Four of the ten sheet mills added to the company's rolling equipment in 1923 were paid for out of earnings. Last year's production was 87,316 net tons and shipments totaled 79,151 tons; 1922 production was 53,660 net tons with shipments of 53,237 net tons.

By the issuance of a small number of shares, the outstanding capitalization of the Hartford Special Machinery Co., Inc., Hartford, Conn., has been made \$250,000.

According to a financial statement dated Oct. 31, 1923, total assets and liabilities of the Moore Drop Forging Co., Springfield, Mass., were \$4,366,683, against \$3,797,108 at the close of 1922. Accounts and notes payable were \$796,703, a reduction of \$100,887, while serial notes were reduced \$145,000 to \$280,000. Surplus was increased \$759,029 to \$878,235. This is one of the best financial statements ever issued by the company.

Last year the Johns-Manville Co. made net profits of \$3,078,928, after allowing for Federal taxes. Net earnings in 1922 were \$2,129,878, or \$85.19 on the then outstanding 25,000 shares, while in 1920 the company earned \$142.77 a share on its capitalization. During 1923, the company completed two new plants, one at Asbestos, Ill., costing \$7,800,000, and another at Asbestos, Quebec, costing \$350,000. It is anticipated that these plants will increase production 50 per cent. Sales last year were \$42,000,000, the greatest since 1920, when \$45,138,181, the high record, was reached.

The Transue & Williams Steel Forging Corporation reported gross sales for 1923 of \$6,246,921, whereas for 1922 they were \$4,170,183, and the year before that, \$3,665,444. Net sales last year were \$5,936,197 against \$3,955,113 in 1922. After deducting manufacturing costs there was net profit of \$508,891, and in 1922 one of \$71,137. After all taxes there was a profit last year of \$458,891, equivalent to \$4.58 a share on the company's 100,000 shares of stock. Last year the company paid \$275,000 in dividends, and in 1922 \$200,000, leaving a surplus last year of \$183,891, which compares with a loss of \$271,137 for 1922. Current assets at the close of 1923 amounted to \$1,061,201 and current liabilities, \$264,815, leaving net working capital of \$796,386. At the close of 1922, current assets were \$880,734, current liabilities \$167,611 and working capital, \$880,734. Marketable securities, not including current assets, amounted to \$1,636,795, against \$1,424,787 at the close of 1922.

Income account of the American Steel Foundries for 1923 gives the operating income at \$9,031,456, as compared with \$4,481,840 in 1922 and \$1,428,187 in 1921. Last year the company charged off \$1,370,392 for depreciation, leaving a balance of \$7,661,044, which with other income brought the total net income up to \$7,912,570. In 1922, there was \$945,625 charged off for depreciation, and a total net income of \$4,088,893, while in 1921, \$512,734 was allowed for depreciation and the net income was \$1,241,338. Interest and other charges brought net profits for 1923 down to \$7,595,944, which when allowance is made for preferred dividend disbursements represents \$9.70 a share earned on the company's 722,196 outstanding shares. In 1922, the company earned \$4.03 on its common stock capitalization, the net profits standing at \$3,709,886.

Net operating income of the Gulf States Steel Corporation for the last quarter of 1923 amounted to \$388,365 against \$478,063 in the previous year. Net income after all charges and taxes reached, \$265,866, against \$336,747 in the same period of 1922. Net earnings for the entire year totaled \$2,169,862 as compared with \$1,406,083 in 1922.

Net income of the Reynolds Spring Co., for 1923, after depreciation and Federal taxes, amounted to \$290,234, as compared with \$257,425 in the previous year. Total current assets as of Dec. 31, 1923, were \$1,118,788 and total current liabilities were \$18,404. Surplus as of that date was \$392,755. President Wiley R. Reynolds in a letter to stockholders said: "Your company manufactured and sold more cushion spring constructions in the year 1923 than ever before and also made a larger net profit." The management looks for an even greater year of profits in 1924.

The assets of the Atlas Steel Corporation, now in hands of receivers, are listed at \$8,600,000, and liabilities as \$6,500,000. The corporation was organized in 1923 under New York laws to manufacture high-speed and carbon tool

steel, alloy and automobile steels, etc. Its plant capacity is 45,000 tons annually. L. J. Campbell is chairman of directors, and named as one of the receivers. The Atlas corporation is a consolidation of the Atlas Crucible Steel Co., Dunkirk, N. Y., with properties consisting of 25 acres of land, furnaces, hammers, rolling mills, etc., and the Electric Alloy Steel Co., incorporated Dec. 24, 1919, in Ohio, which in turn acquired the Universal Steel Co., Charleroi, Pa., in 1920. The Atlas Crucible Steel Co. was incorporated in June, 1912, as a reorganization of the Atlas Steel Co., which was established in 1907. In May, 1918, the company acquired the Dillon Crucible Alloys, Ltd., Welland, Ontario. There is no connection between the Atlas Steel Corporation and the Atlas Steel Casting Co. of Buffalo.

Joseph N. LaPointe has been made receiver for the Arnold Electric Tool Co., New London, Conn.

## NEW TRADE PUBLICATIONS

**Mazda Lamps in Photography.**—Edison Lamp Works, General Electric Co., Harrison, N. J. Bulletin 149 of 24 pages is devoted to the problem of indoor photography with the aid of artificial lighting. Examples are shown of different types of handling and with varying lengths of exposure. The system is particularly adaptable to industrial use.

**Woodworking Machinery.**—Oliver Machinery Co., Grand Rapids, Mich. General catalog describing the company's woodworking machinery, engine lathes, and die filers for metal workers being also shown. The volume, which is designated as the No. 22 and is the first general catalog issued by the company since 1918, has 320 pages, 6 x 9 in., and is bound in cloth. In reviewing the catalog one is impressed with the extension in safeguarding machinery used in woodworking and increased application of the direct motor drive. Illustrations are numerous and include line drawings. Complete specifications are given on all units. The items include saw benches, rip saws, cut-off saws, band saws, surfacers and hand planers and jointers. A broad line of wood lathes and a variety of sanders are shown. Multiple and single borers, wood milling machines, mortisers, tenoners, wood shapers and wood trimmers are among other items, and a variety of tool grinders, knife grinders and accessories, work benches, hand screw, clamps and forges are described in several pages. The engine lathes range from 16 to 26 in. heavy-duty type and screw cutting engine lathes in 10, 12 and 14 in. sizes are shown. The die filing machines described are of the Rearwin patent.

**General Purpose Power Plant.**—Smith Gas Engineering Co., Dayton, Ohio. Bulletin No. 20 of 8 pages describes a General Motors Co. truck engine and a General Electric Co. generator combined in an electric unit of 17½ kw., and the engine, rated at 25 hp. and equipped with a 12-in. pulley, for belting to shafting, pump or other machine. As both parts are standardized equipment and fitted to each other, the combination produces a thoroughly dependable, durable and economical source of power. Not the least feature is the fact that spare parts are easily obtainable on short notice. The generator is d.c., wound for 125 or 250 volts or for 3-wire 250 volts. The governor is set at 1120 r.p.m. The plant is reported to deliver 5 kw. hr. per gallon of gasoline, making the fuel cost 4c. per kw. hr., with 20c. gasoline.

**Testing Machines.**—Alfred J. Amsler & Co., Schaffhouse, Switzerland. A 24-page catalog of testing machines and auxiliary equipment for making tension, compression, transverse and bending tests. Included in the group are rope and chain-testing machines, as well as those devoted to metals as such. There is also an abrasion testing machine, a bending machine, machine for testing the effects of alternating stress, etc. The machines run up to a maximum of 500 tons capacity.

**Lighting Legislation.**—Edison Lamp Works, General Electric Co., Harrison, N. J. Bulletin 148 of 24 pages is devoted to industrial and other lighting codes, motor vehicle head light regulations and other kindred matters. It contains an extensive bibliography and shows how some of the regulations have been brought about.

**Torsion Dynamometers.**—Alfred J. Amsler & Co., Schaffhouse, Switzerland. 12-page catalog of a dynamometer with stroboscopic arrangement for taking readings. Used as a coupling between the source

of power and its absorption, this instrument is particularly valuable in the testing of steam turbines and similar equipment where the ordinary form of indicator card is not applicable. The principal sizes made range from 70 ft. lb. to 14,000 ft. lb., there being seven such sizes standardized. Special sizes may be had on order.

At the annual meeting of the Mill & Mine Supply Co., held at the office of the company, 211-215 South Broadway, Akron, Ohio, on Jan. 22, the officers reported a very good year for 1923, and prospects for 1924 business greater than at any time since the spring of 1920. Dividends of 8 per cent were paid on the preferred issue for the year just ended. The following officers and directors were elected: W. W. Sharp, president; M. A. Knight, vice-president; Fred Good, secretary; Chris Franz, treasurer; William O'Neil, William Boesche, Alexander Adamson, G. A. Rohner and A. G. Teeple, directors.

The General American Tank Car Corporation reports net income for 1923 of \$1,818,256, after charges and taxes, equivalent after preferred dividends to \$4.66 per share on the outstanding common stock. This compares with net income of \$1,521,795 in the previous year.

A booklet of 52 pages, 3½ x 6¼ in., and bearing the title of "The Art & Science of Grinding" has been issued by the Cleveland Stone Co., Cleveland, and the Sterling Grinding Wheel Co., Division, Tiffin, Ohio. Sterling wheels are described and prices given. Considerable data helpful to users of grinding wheels is included. Wheel selection tables, correct operating speeds, shapes of wheel faces, rules for calculating list prices of various types of wheels, and data are given.

A wide line of cars for iron and steel plants and other industrial uses, available for any track gage and of small and large capacity, and also ore cars in a large variety of styles, are illustrated in the general catalog of the Watt Mining Car Wheel Co., Barnesville, Ohio. The catalog, which consists of 156 pages 8½ x 11 in., includes a section showing various types of steel body and composite mine cars, a section being also devoted to wheel designs, details of construction being clearly illustrated. A variety of mine car couplings are shown in the concluding section.

The Turner Construction Co., New York, has joined the ranks of industrial establishments conducting house organs. No. 1 of Volume 1 of the Turner Constructor appeared in January. Besides views of conspicuous buildings it erected in 1923, it contains an article on a graphical method of controlling costs in finishing up a job.

The treatment of boiler feed water for highly overloaded boilers is the subject of a pamphlet by David Henderson of the Dravo-Doyle Co., Pittsburgh, in which he discusses the effect of suspended matter, sodium salts and organic matter in promoting foaming and priming. A copy can undoubtedly be had by applying to the H. S. B. W. Cochrane Corporation, Philadelphia.

## New Books Received

**American Iron and Steel Institute.** Year Book for 1923. Pages 484, 9¼ x 6 in.; illustrated. Published by the American Iron and Steel Institute, 40 Rector Street, New York.

**Mechanical World Year Book, 1924.** Pages 521, 4¼ x 6¼ in.; 100 figures. Published by Emmott & Co., Ltd., 65 King Street, Manchester, England. Price, 1s. 6d.

**Elektrische Temperatur-Messgeräte.** By Dr. Ing. Georg Keinath. Pages 275, 6¼ x 9¼ in.; illustrated. Published by R. Oldenbourg, Glückstrasse 8, Munich, Germany. Price, paper cover, 10.80 goldmarks; bound, 12 goldmarks.

**Association of Iron and Steel Electrical Engineers.** Proceedings for 1922. Pages 892, 6 x 9¼ in.; illustrated. Published by the association, J. F. Kelly, Pittsburgh, secretary.

**The Price of Coal, Anthracite and Bituminous.** Vol. CXI, No. 200 (January, 1924) of Annals of the American Academy of Political and Social Science. Pages 387, 6¼ x 9¼ in. Published at Thirty-ninth Street and Woodland Avenue, Philadelphia. Price, \$1.



# Machinery Markets and News of the Works

## INQUIRIES GOOD—SALES LAG

### Santa Fe Adds 44 Items—National Tube Co. Issues List

#### Standard Sanitary Mfg. Co. to Make Awards—National Plate Glass Co. Revives Inquiry

A good volume of inquiry but comparative lag in buying, and a predominance of single tools in the orders being placed is the condition reported from practically all centers. Automotive buying is noted in Cincinnati and Milwaukee. Inquiry seems to be broadening and the general aspect for the most part is encouraging. Active demand for used machinery is noted.

The Santa Fe System has issued inquiries for 48 additional machines, which makes a total of 100 on which it has asked for prices. The New York Central has added six or eight tools to its recent inquiries.

A list of more than 40 tools has appeared from the National Tube Co., the equipment being for its new tube works at Gary, Ind. The list includes 14 lathes, 7 boring mills and 6 drill presses. The National Plate Glass Co., has revived its inquiry for 11 machine tools for its repair shop at Ottawa, Ill., and is expected to place orders shortly. A Newport, R. I. company has inquired for a 14, 17 and 32-in. geared head lathe.

The General Electric Co., has inquired for a number of tools for its Schenectady and Erie plants. The Westinghouse Electric & Mfg. Co., is expected to purchase shortly some of the larger tools included in its list issued a few weeks ago.

Recommendations are reported to have been made and awards are expected within the week on the list of the Standard Sanitary Mfg. Co., for its new Baltimore plant.

Definite information concerning the needs of the Nash Motor Co., in retooling the former Mitchell automobile works at Racine, Wis., is expected next week.

The Great Northern has closed for a number of machine tools, involving an outlay of about \$30,000.

The Otis Elevator Co., New York, was one of the largest buyers of the week, taking 15 to 20 tools. It is understood that the A. O. Smith Corporation, Milwaukee, has placed a few additional items against its list.

In used equipment, two inquiries from southern Illinois involve \$10,000 and \$5,000, respectively, and one from Wisconsin amounts to \$7,000. A Western dealer is credited with the purchase of several carloads of used machinery in the Eastern markets for shipments to the Pacific Coast. Dealers in Milwaukee are figuring on the used tool needs of the Chicago, Milwaukee & St. Paul Railway.

Manufacturers of woodworking machinery are reported exceptionally busy.

## New York

NEW YORK, Feb. 11.

**M**ACHINE-TOOL buying shows no improvement, the volume of business so far this month being about on a par with that of last month. The Otis Elevator Co., New York, was one of the largest buyers of the week, taking 15 to 20 tools. The General Electric Co. has inquired for a number of tools for Schenectady and Erie plants. The New York Central has added six or eight tools to its recent inquiries. The Southern Railway bought a 100-ton bushing press and the Missouri Pacific also bought a 100-ton bushing press. The Carnegie Steel Co. ordered a 6-ft. radial drill.

Fire, Feb. 2, destroyed practically the entire plant of the Taylor Electric Truck Co., Colonie, N. Y., manufacturer of street railroad car trucks, with loss estimated at \$300,000 including equipment. It is planned to rebuild.

Joseph Stolz & Son, Inc., Commerce Avenue and 170th Street, New York, operating a structural steel works, has inquiries out for one 10-hp. double drum hoist, vertically or horizontally geared, operated by internal combustion engine, including tools, fittings and auxiliary apparatus.

An ice-manufacturing, refrigerating and general steam power plant will be installed in the seven-story municipal market to be erected at Cromwell Avenue and the Harlem River, New York, by the Department of Plant and Structures, Municipal Building, Grover A. Whalen, commissioner, estimated to cost \$7,500,000.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a Swiss company which has secured permission to construct and operate a hydroelectric generating plant on the Albigna River, with initial capacity of 30,000 hp., reference No. 119,201. Also, of a similar project in the vicinity of Johannesburg, South Africa, where a Government commission and power company are perfecting arrangements for a generating plant to cost \$3,000,000 with machinery, reference No. 119,243.

The Charles A. Cowens Co., 30 East Forty-second Street, New York, William N. Croxton, president, has plans for a two-story automobile service and repair building, 85 x 90 ft., at 16 Convent Avenue, to cost \$150,000 with equipment. Charles Kreymborg, 2534 Marion Avenue, is architect.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, is arranging for an increase in capital from \$50,000,000 to \$75,000,000, a portion of the proceeds to be used for extensions during the year, including a new 40,000 hp. steam-operated power plant.

The General Fireproof Door Corporation, 129 Thirteenth Street, Brooklyn, has purchased property, 100 x 150 ft., on Whittier Avenue, New York, and will have plans drawn at once for a new plant.

Bids will be asked early in March by the Albany Garage Co., Inc., Howard and William Streets, Albany, N. Y., for a five-story service, repair and general garage, 125 x 216 ft., to cost approximately \$50,000 with equipment. Fuller & Robinson, 95 State Street, are architects. C. D. Hakes is general manager.

The New York Edison Co., Irving Place and Fifteenth Street, New York, will build a 100,000 hp. steam-operated electric generating plant during the year.

The Albany Hardware & Iron Co., 41 State Street, Albany, N. Y., is having plans drawn for a five-story distributing and storage plant, 120 x 200 ft., estimated to cost \$500,000 with material-handling and other machinery. It is expected to ask bids early in the summer. Fuller & Robinson, 95 State Street, are architects. W. I. Baker is president.

The Staten Island Rapid Transit Railroad Co., St. George, S. I., operated by the Baltimore & Ohio Railroad Co., is perfecting plans for the electrification of its Tottenville and South Beach lines, the work to commence early in the summer, to cost more than \$3,000,000 with power and other equipment. Robert B. White is general manager.

The State Department of Canals, Albany, N. Y., Royal K. Fuller, commissioner, will soon commence superstructure work for its hydroelectric generating plant at the Vischer Ferry dam, and will install machinery early in the fall. It will have a capacity of about 15,000 hp.

## The Crane Market

Very little new inquiry is noted, either for locomotive cranes or overhead traveling cranes. Action on the list of cranes for the Western Electric Co., for its new plant at Kearny, N. J., is still delayed, a few minor revisions of specifications having been made recently. The two 100-ton overhead cranes asked for by the General Electric Co. for Pittsfield plant are still pending and in addition, Schenectady, N. Y., has issued an inquiry for one 30-ton, 40-ft. 9-in. span crane for Pittsfield and a 10-ton and 15-ton crane, 21-ft. 9-in. span, for the Schenectady plant. The inquiry of the Erie Railroad for a 40-ton used locomotive crane is still open. The J. G. White Engineering Co., 43 Exchange Place, New York, has closed on a small special type gantry crane for the Boyce-Thompson Institute, Yonkers, N. Y. The Interborough Rapid Transit Co., New York, is expected to close shortly on four 25-ton overhead cranes for its shops at 147th Street, New York. The Southern Power Co., 511 Fifth Avenue, New York, has closed on a 75-ton, 46-ft. span overhead crane. The Blaw-Knox Co., Pittsburgh, has inquired for two 10-ton, 70-ft. span, 3-motor cranes and a motor-driven transfer car. The Allegheny Steel Co., Bradenridge, Pa., is asking for a 25-ton, 75-ft span, 3-motor overhead crane.

Among recent purchases are:

M. W. Kellogg Co., Jersey City, N. J., a 5-ton, 27-ft. span, electric traveling crane from the Milwaukee Electric Crane & Mfg. Co.

National Plate Glass Co., Ottawa, Ill., a 12-ton, 56-ft. 11-in. span, two 5-ton, 87-ft. and 67-ft. 6-in. spans, a 3-ton, 96-ft. 11-in. span, two 20-ton, 56-ft. 11-in. span and 53-ft. 10-in. spans, three 8-ton, 70-ft. span and three bucket handling cranes, two 59-ft. 9-in. span and one 51-ft. 11-in. span, all for 1-cu. yd. buckets, from the Whiting Corporation.

Erie Railroad, New York, a 4000-lb. electric hoist for Hornell, N. Y., from the Shepard Electric Crane & Hoist Co.

Wheeling Steel Corporation, a 20-ton, 72-ft. span mill type crane for the Yorkville, Ohio, works, from the Cleveland Crane & Engineering Co.

American Steel & Wire Co., Pittsburgh, a 10-ton, 59-ft. span, 4-motor overhead crane, with 5-ton auxiliary from the Cleveland Crane & Engineering Co.

Central Architectural Iron Works, Chicago, two 3-ton 22-ft. span handpower cranes from H. D. Conkey & Co.

Burke Steel Co., Rochester, N. Y., a 1½-ton mast type jib crane from H. D. Conkey & Co.

Boyle Ice Co., Chicago, two 1-ton electric hoists from the American Engineering Co., Philadelphia.

Love Brothers, Inc., Aurora, Ill., two 3-ton, 2-motor hoists from the American Engineering Co.

J. B. Harvey, formerly connected with the Grasselli Chemical Co., New York, and E. A. Storms, have organized the Storms-Harvey Equipment Co., 30 Church Street, to manufacture chemical machinery and parts. Arrangements will be made for a local works. Mr. Storms will be president of the new company and Mr. Harvey, vice-president and treasurer.

Manual training equipment will be installed in the two-story high school to be erected at Lincoln Street and Central Avenue, Orange, N. J., estimated to cost \$850,000, for which bids will be asked on general contract during February. Ernest Sibley, Bluff Road, Palisade, N. J., is architect.

The Eclipse Machine Co., Elmira Heights, N. Y., has leased three floors in the Hoboken, N. J., Terminal Building A, totaling 30,000 sq. ft., for a factory branch.

A one-story power plant will be constructed by the Peerless Plush Mfg. Co., 71 Franklin Street, Paterson, N. J., at its proposed textile mill at Pleasantville, N. J., estimated to cost \$250,000. Russell G. Cory, 30 Church Street, New York, is architect and engineer.

The Board of City Commissioners, City Hall, Newark, N. J., has approved an appropriation of \$70,000, for the installation of additional equipment at the power house and water supply system at the city hospital, Fairmount Avenue.

L. Bamberger & Co., 147 Market Street, Newark, operating a department store, will take bids within a few days for the erection of a five-story automobile service and repair building for company motor trucks and cars, and warehouse, estimated to cost \$1,000,000 with equipment. Abbott, Merkt & Co., 175 Fifth Avenue, New York, are engineers.

The Public Service Corporation, Public Service Terminal, Newark, plans a fund of \$20,000,000 for extensions in its electric and gas properties during the year, including the installation of equipment.

## Philadelphia

PHILADELPHIA, Feb. 11.

**T**HE Philadelphia Electric Plating Co., Philadelphia, has purchased the buildings at 456-62 North Percy Street and 906 Buttonwood Street, adjoining, and will remodel for a new plant.

The Richard Mfg. Co., Bloomsburg, Pa., is inquiring for a used bevel gear cutter or planer for work up to 23-in. pitch diameter.

The Autocar Co., Ardmore, Pa., manufacturer of motor trucks, has acquired property at Arch and North Douglas Streets, Philadelphia, 184 x 200 ft., and will have plans drawn for a service and repair works, estimated to cost \$350,000 with equipment.

The Ford Motor Co., Highland Park, Detroit, has arranged a fund of \$1,500,000 for its proposed branch plant at Sixty-third to Sixty-seventh Street and the Schuylkill River, Philadelphia, with main one-story assembling building, 300 x 1100 ft., and power plant. Albert Kahn, Marquette Building, Detroit, is architect.

The Swain-Hickman Co., 2116 Market Street, Philadelphia, motor trucks and parts, has leased the building to be erected at 3619-23 Lancaster Avenue, to cost about \$125,000, for a new service and repair works.

The John N. Gill Construction Co., Otis Building, Philadelphia, has taken a contract for foundation and building for a power house at the meat-packing plant of Louis Burk, Inc., Third and Thompson Streets, to cost \$150,000 including equipment. A radial brick stack will also be built.

B. Liebovitz, 4025 Baltimore Avenue, Philadelphia, is having plans drawn for a one and two-story automobile service and repair building, 76 x 300 ft., at Ridge and Gerhardt Streets, to cost about \$200,000 with equipment. J. F. Canavan, 7032 Greenway Avenue, is architect.

The Corrugated Container Co., Sepviva and Venango Streets, Philadelphia, has awarded a general contract to the Robbins Contracting Co., 1137 Front Street, for a two-story addition, totaling 17,000 sq. ft., estimated to cost \$33,000. William Lowenthal, 1208 Chestnut Street, is engineer.

The Lehigh Valley Coal Co., Liberty Building, Philadelphia, is considering the installation of mining machinery, electric power and other equipment at its anthracite properties. A portion of a bond issue of \$15,000,000 now being sold will be used for the expansion. J. M. Humphrey is president.

The John A. Roebling's Sons Co., Trenton, N. J., will remodel a building heretofore used as a rolling mill and equip for flat wire production.

John S. Bissinger, Jr., 323 West Lime Street, Lancaster, Pa., will commence the construction of a two and three-story automobile service and repair building, 25 x 255 ft., to cost \$160,000. J. B. Harman, 48 North Queen Street, is architect.

A power house will be constructed by the Sal-Co-Lene Co., Three Rivers, Mich., at its proposed branch plant at Sunbury, Pa., estimated to cost \$500,000 with equipment. Dr. F. K. Moyer is president.

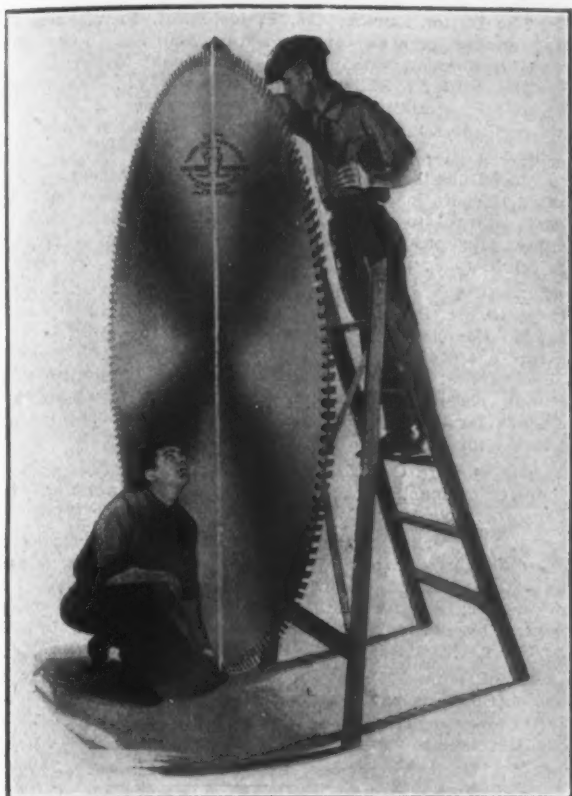
The Beaver Valley Coal Co., Scotch Valley, near Hazleton, Pa., is planning the construction of a new steel coal breaker at its properties, with daily output of about 200 tons. Stewart E. Button, formerly head of the State Department of Mines, is one of the heads of the company.

Manual training equipment will be installed in the two-story and basement high school to be erected at Forty Fort, Pa., estimated to cost \$300,000, for which bids will soon be asked on a general contract. Ralph M. Herr, Simon Long Building, Wilkes-Barre, Pa., is architect.

Schmitt & Schroeder, Weltzenkern Building, Wilkes-Barre, Pa., architects, are preparing plans for a one-story marble cutting and finishing works on North Main Street, 75 x 180 ft., for which the owner's name is temporarily withheld.

The plant and property of the Lehigh Machine Co., Leighton, Pa., has been acquired at a receiver's sale by Russell Jones, George Arner and R. O. Sendel, all of Leighton, for \$46,410. The new owners plan to organize





THE circular saw illustrated at the left is believed to be the largest saw of its type. It measures 108 in. in diameter, and weighs 795 lb. The circumference of the saw is more than 28 ft., and in operation the rim travels at the speed of 130 miles per hr. Two of these saws were furnished by Henry Disston & Sons, Inc., for a lumber mill in the State of Washington, where they are used to cut giant cedar logs into shingle bolts. Two 100-in. diameter saws are also being used by the same company.

Each saw was made from a steel ingot weighing 1140 lb., the steel being of special analysis and of high tensile strength, made in the Disston plant. The steel was cast in a solid block and the ingots from the crucible were heated and hammered into slabs, which in turn were rolled into plates, one for each saw. The plates were then drawn to the correct dimensions for the saws, which required several operations. Next the plates were made ready for the insertion of the teeth, hardened and tempered, and given the correct tension for operating at the high speed at which they are required to run.

The teeth are inserted in the blade, 190 being required for each saw. They are of the company's spiral tooth type, being inserted in the blade on spiral lines, which is intended to assure smooth cutting and give full clearance without the necessity of setting them. Each tooth is  $2\frac{1}{2}$  in. long by  $\frac{3}{4}$  in. wide. The cutting edges of the teeth alternate.

a company and operate the plant. Mr. Jones is head of the Lehigh Stove Works.

The Harrisburg Auto Co., Fourth and Kelker Streets, Harrisburg, Pa., is planning to double the size of its machine and repair department, and will install additional equipment. S. T. Stinson is service manager, in charge.

The Hershey Machine & Foundry Co., Manheim, Pa., manufacturer of iron and steel castings, etc., has tentative plans for a one-story addition to its machine shop. R. K. Hershey is head.

The Shyrook Paper Co., Dorian, near Downingtown, Pa., plans for the immediate rebuilding of its mill, partially destroyed by fire Feb. 8, with loss withheld. The plant has been closed temporarily pending reconstruction.

Plans have been completed for the construction of a power house at the State Hospital, Danville, Pa., and bids are being asked on general contract. It will cost about \$75,000. F. Arthur Rianhard, Masonic Temple, Williamsport, Pa., is architect. Fred M. Sprout, State Hospital, is chairman of the building committee, in charge.

The Panther Valley Water Co., Lansford, Pa., a subsidiary of the Lehigh Coal & Navigation Co., 437 Chestnut Street, Philadelphia, plans the installation of electric-operated pumping machinery in connection with a proposed water supply system from Still Creek, to cost about \$1,500,000.

The Pennsylvania Engineering Works, Inc., New Castle, Pa., manufacturer of iron and steel castings, etc., is establishing a new department for the production of oil tanks, gas holders and similar products. Considerable additional machinery will be installed. Edward W. Beadel is president.

The Delaware, Lackawanna & Western Railroad has ordered an 800-ton wheel press, 108 in. between tie rods, from the Chambersburg Engineering Co., Chambersburg, Pa. This is believed to be the largest wheel press ever built in this country.

## Detroit

DETROIT, Feb. 11.

TENTATIVE plans are being arranged by the Hugh Lyons Co., Lansing, Mich., manufacturer of store fixtures, etc., for an addition to its power plant, including the installation of engines, generators and auxiliary equipment. The company is commencing the erection of a three-story factory unit, 60 x 120 ft., to cost \$100,000 with machinery.

The Wise Electro-Sherardizing Co., 6320 East Fort Street, Detroit, has awarded a general contract to Martin Krausmann, Guaranty Trust Building, for a one-story plant, 60 x 230 ft., estimated to cost \$42,000. A. F. Herman, Owen Building, is architect.

The Maxwell Motor Corporation, Oakland Avenue, Detroit, has preliminary plans for extensions in its branch plant at Dayton, Ohio, including the remodeling of a number of buildings and the installation of additional equipment, with cost placed at \$85,000.

The Mutual Electric & Machine Co., 858 West Fort Street, Detroit, is arranging to remove its two local plants to the property of the Aluminum Castings Co., recently acquired, consisting of 8 acres, with a number of one-story structures. The works will be consolidated and enlarged and additional equipment installed.

The Michigan Artificial Ice Products Co., 1001 Real Estate Exchange Building, Detroit, Milton Carmichael, secretary, has tentative plans for the construction of ice-manufacturing plants in about ten cities and towns in the State, with average approximating \$85,000 to \$100,000 including equipment.

The Collins Stamping & Mfg. Co., Detroit, has closed negotiations with the Chamber of Commerce, Mount Pleasant, Mich., for a site for a plant and will have plans prepared at once. The estimated cost is placed in excess of \$50,000. The company manufactures electrical equipment, automobile stampings, radio apparatus, etc., and will remove the present plant to the new location, installing additional equipment. J. R. Collins is president and general manager.

The Hayes Wheel Co., Jackson, Mich., manufacturer of automobile wheels, etc., is arranging for a preferred stock issue of \$5,000,000, of which about \$2,000,000 will be used for enlargements, including the acquisition of other properties.

The Schleider Mfg. Co., 2838 East Grand Boulevard, Detroit, manufacturer of valves and kindred engineering products, is considering the purchase of a site at Milford, Mich., and the removal of its plant.

The Buick Motor Co., Flint, Mich., a division of the General Motors Corporation, Detroit, is planning to commence erection early in March on a four-story and basement addition, 80 x 500 ft., for parts production to cost approximately \$450,000 with machinery. The company also has plans for another four-story structure, 80 x 210 ft., for general production, as well as a three-story and basement building, 50 x 260 ft., for general service. Work on the two last noted buildings will commence in the spring. All will be located on Industrial Avenue. H. H. Bassett is president and general manager.

Fire, Feb. 6, destroyed a portion of the plant of the Jansen Mfg. Co., 1040 Fourteenth Street, Detroit, manufacturer of mechanical belting, etc., with loss estimated at \$100,000 including equipment. It is planned to rebuild.

Manual training equipment will be installed in the three-story and basement school to be erected on Pasadena Avenue, Flint, Mich., to be known as the Whittier Junior

high school, estimated to cost \$750,000, for which bids will be asked on a general contract about Feb. 15. Malcomson & Higginbotham, F. P. Smith Building, Flint, are architects.

The Duplex Truck Co., Lansing, Mich., which recently sold its factory to the Reo Motor Car Co., has leased the property and buildings of the Lansing Foundry Co., Hosmer Street, and is moving to those quarters.

## New England

Boston, Feb. 11

WHILE sales of machine tools in this territory are unimportant, the trade is more optimistic than at any previous time this year, due to an accumulation the past week of new inquiries, which, although small individually, aggregate a good volume. The inquiry of a greater Boston shop for a small milling machine, and that of a Newport, R. I., firm for a 14-in., 17-in. and 32-in. geared head lathe are typical of the newest prospects.

Much significance is attached by local dealers to the unusually large number of small manufacturers who personally inspected machinery during the week, and which is believed to be an indication of greater activity in New England shops. Small inquiries have developed from Connecticut, a section inactive for a long period.

Interest in new tools is greater than in used, and usually little fault is found with prices quoted. When used tools are wanted, however, price is the controlling factor. Indications are that machine tool sales the last half of this month will be materially larger.

The city of Springfield, Mass., has taken an option on a one-story plant at Liberty Street and Columbia Terrace where it is proposed to establish a repair shop for fire, street and engineering departments.

The H. F. Livermore Co., 100 Cummington Street, Boston, mill supplies, contemplates the erection of a three-story plant with 15,000 ft. of floor space. The company is negotiating for land.

Chester L. Hathaway, 25 Elm Street, New Bedford, Mass., gasoline engines, has awarded contract for a one-story, 50 x 100 ft., machine shop and foundry addition to cost \$25,000. Plans are private.

Plans for a two-story, 50 x 100 ft. machine shop will soon be erected in Peabody, Mass. The owners name is temporarily withheld. Smith & Walker, 80 Boylston Street, Boston are the architects.

Work has been started on a three-story, 230 x 232 ft., high school to cost \$700,000 for Chelsea, Mass. It will contain a machine shop and manual training departments. L. F. Quigley is mayor. S. S. Eisenberg, 46 Cornhill, Boston is the architect.

Plans for the superstructure of the new power station for the United Illuminating Co., Broad Street, Bridgeport, Conn. will be ready in April. Westcott & Mapes, 139 Orange Street are the architects.

Krokyn & Brown, 7 State Street, Boston, architects are taking bids on a one-story 120 x 160 ft. plant on Locust and Von Hillern Streets, Dorchester, contemplated by the National Can Co., 36 North Washington Street.

The Continental Wood Screw Co., New Bedford, Mass., is having plans prepared for a two-story 80 x 100 ft., brick and steel addition to the Mt. Pleasant Street plant, to cost about \$55,000.

The Manchester Marble Co., 117 West Street, Dorset, Vt., is clearing the site for its one-story mill, 55 x 175 ft., estimated to cost \$75,000, with cutting, polishing and other machinery. P. R. Eaton is general manager.

W. D. Clement, 129 Beacon Street, Waltham, Mass., operating a machine shop, is planning for the installation of a radial drill; bench lathe and other tools.

The Narragansett Electric Lighting Co., Providence, R. I., is completing plans for additions in its steam-operated electric generating plant on Eddy Street, for which an appropriation of \$1,000,000, has been approved, including machinery. Jenks & Ballou, Grosvenor Building, are architects.

The Connecticut Light & Power Co., Waterbury, Conn., is disposing of a bond issue of \$5,750,000, a portion of the proceeds to be used for extensions. It is proposed to increase the present generating plants by about 90,000 hp. during the year. Irvin W. Day is vice-president.

The Dutton Lumber Co., Fields Point, Providence, R. I., is planning for a one and two-story addition, to cost \$50,000 with equipment, which will be electrically-operated.

The Rutland Railway Co., Rutland, Vt., has tentative plans for an addition to its car repair shops at Alburg, Vt., to cost \$60,000 including equipment. L. G. Murphy is engineer.

The Russell & Erwin Division of the American Hardware Corporation, New Britain, Conn., has awarded a general contract to the Aberthaw Construction Co., 27 School Street, Boston, for a six-story and basement addition, 60 x 140 ft. to cost \$150,000.

The Cumberland County Power & Light Co., 453 Congress Street, Portland, Me., has awarded a general contract to the Foundation Co., New York, for the addition to its steam-operated electric generating plant at Knightville, Me., to cost \$1,250,000 with machinery, for which orders will be placed immediately. The company is arranging for a stock issue of 30,000 shares of common, no par value, to provide for expansion.

The Stafford Co., 1715 Hyde Park Avenue, Boston, manufacturer of machinery, is reported to be planning the purchase of tools for its new machine shop.

The Haverhill Gas Light Co., Haverhill, Mass., has acquired the plant and property of the Amesbury & Salisbury Gas Co. and will consolidate with its system. Plans are under way for the installation of additional coal-gas generating machinery. The property is operated by Stone & Webster, Inc., 147 Milk Street, Boston, engineer.

The Bristol & Plainville Electric Co., Riverside Avenue, Britol, Conn., is having plans drawn for a one-story addition to its electric generating plant. The Charles H. Tenny Co., 200 Devonshire Street, Boston, is engineer.

## Pittsburgh

Pittsburgh, Feb. 11.

THE machine tool market has been more active the past week. The Pennsylvania Railroad has begun to close against its list for the locomotive repair shop at Sharpsburg, Pa., and the Westinghouse Electric & Mfg. Co., which made a number of purchases of minor items on its list issued a few weeks ago, is expected to go ahead in the near future on the larger tools. A list of more than 40 tools has appeared from the National Tube Co., in carrying forward the completion of its new tube works at Gary, Ind., including 14 lathes, 7 boring mills and 6 drill presses.

The latest information about the list of the Standard Sanitary Mfg. Co., for its new Baltimore plant is that recommendations have been made and awards are expected within the next few days. It is believed that tools now in use in the company's Pittsburgh and New Brighton plants will be duplicated for the new unit. Individual tool sales still are good and inquiries are so numerous that the trade feels that 1924 will be a good year if only half of the prospective orders are closed.

A fund of \$5,000,000 has been arranged by the Duquesne Light Co., 435 Sixth Street, Pittsburgh, for extensions, including station additions, and steel tower transmission lines.

The Electric Mfg. & Repair Co., 400 Duquesne Way, Pittsburgh, has acquired the property of the Eureka Garage, Chateau Street, 62 x 85 ft., for a new plant.

The General Foundry & Machine Co., Peoples' Building, Pittsburgh, has purchased the plant of the Allegheny Forging Co., McDonald, Pa., consisting of 2½ acres and a number of buildings with power house. The new owner will take immediate possession and will equip the property for a new plant.

The Sitnek Coal Mining Co., recently organized by Louis Sitnek of the Sitnek Fuel Co., Pennsylvania Building, Philadelphia, and associates, has acquired the Katherine mining properties of the Antler Coal Co., Lumberport, W. Va., totaling 200 acres, and plans the installation of additional equipment to cost \$90,000.

The Bluefield Gas & Power Co., Bluefield, W. Va., plans for extensions in its plant and system to cost \$60,000, including the installation of additional equipment. J. C. Nichols is general manager.

The West Virginia Rail Co., Huntington, W. Va., is completing a new plant unit for the production of frogs for railroad tracks, with special manganese steel points



and other track devices, with facilities for about 60 additional operatives.

The Pittsburgh Auto Equipment Co., 5933 Baum Boulevard, Pittsburgh, has filed plans for a new five-story factory, estimated to cost \$120,000.

The Pittsburgh Brewing Co., 3340 Liberty Avenue, Pittsburgh, will commence the construction of a one-story refrigerating plant, 100 x 140 ft., to cost \$175,000 including machinery.

B. G. Cain, Huntington, W. Va., will commence the erection of a three-story automobile service and repair building, 60 x 145 ft., to cost \$150,000 including equipment.

The Wheeling Steel Corporation, Wheeling, W. Va., is planning the installation of an industrial oxygen plant at its Portsmouth, Ohio, works, estimated to cost \$75,000.

The Spice Creek Land Co., Welch, W. Va., E. W. Cullen, president, has tentative plans for the installation of mining machinery and electric power equipment on coal lands at Rhoderfield, W. Va., recently acquired. The company has lately been formed.

Officials of Blanchard & Co., Fulton Building, Pittsburgh, have formed the Blanchard-Ohio Edison Coal Co., designed primarily to furnish coal for the new generating plant of the Ohio Edison Co., at Toronto, Ohio, now in course of erection. A tract of 4000 acres has been acquired near Toronto and a mining plant to cost about \$600,000 will be installed, with tipples and other structures. W. G. Blanchard is president.

## Cleveland

CLEVELAND, Feb. 11.

THE volume of machine tool business fell off somewhat during the week. Manufacturers and dealers are getting a steady flow of orders but these with a few exceptions are for single machines. The demand from Detroit automobile manufacturers has fallen off and little activity is reported in that city. While new inquiries are not as numerous as a week or two ago, machine tool manufacturers are figuring on several fair sized lots.

There is an active demand for good used machinery particularly punch presses, plain and universal milling machines, radial drills and power squaring shears, but the supply of these machines in good condition is not plentiful. A Western dealer is credited with the purchase of several carloads of used machinery in Eastern markets the past few days for shipment to the Pacific Coast.

Orders for two ore handling cranes have been placed in the Buffalo district, one for the Donner Steel Co. and the other for the blast furnace plant of the American Radiator Co. at Tonawanda, N. Y. Both orders went to the Mead-Morrison Co.

The Hoover Suction Sweeper Co., North Canton, Ohio, is planning several extensions including an administration building, a four-story factory and office building, 80 x 300 ft., foundry, dye shop, 114 x 145 ft., and a dye storage building, 40 x 80 ft. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, Chicago, are the architects. The Hunkin-Conkey Construction Co., Cleveland, has the general contract.

The J. Roemer Heating Co., 1808 East Twenty-second Street, Cleveland, has taken bids on a factory for light manufacturing. It will be a one-story, 80 x 125 ft. The W. S. Ferguson Co., 1900 Euclid Avenue, is the architect.

The Elyria Iron & Steel Co., Cleveland, is planning a number of improvements to its plant at Elyria, Ohio, including the installation of electrical equipment to replace the present steam equipment in its hot strip steel department and extensions to the cold rolled strip department. Additional cold roll mill equipment will be purchased. Borton R. Shover, Oliver Building, Pittsburgh, is the engineer.

The city of Lorain, Ohio, will take bids Feb. 19 for extensions to its waterworks plant which will include filter beds and equipment, pipes, valves, etc., providing a daily capacity of 5,000,000 gal. C. C. Miller is the city engineer.

The Nickel Plate Foundry Co., 14915 Woodworth Road, Cleveland, plans shortly to begin the erection of an addition, 96 x 160 ft. C. E. Kapitzky is the president.

The Sandusky Cement Co., Sandusky, Ohio, is planning the erection of additions to its plant at Bay Bridge and the installation of an additional grinding department.

The Rupp Shear & Forge Co., Cleveland, recently organized with a capital stock of \$20,000, will manufacture

tinners, snips and forgings. It is affiliated with the Rupp Machine Co. and both companies occupy the same plant. August Hurschman is president of both organizations.

The Buckeye Aluminum Ware Co., Wooster, Ohio, is planning for the installation of some new equipment, including a motor driven forge.

William Hilliard, Wooster, Ohio, who has just completed construction of a garage and service station is planning for the installation of equipment to include drill press, grinder, reboring machine, etc.

Electrical pumping machinery and auxiliary equipment will be required for the new sewerage disposal plant to be erected at Kenmore, Ohio, for which a bond issue is being arranged. Don Dowling is city engineer in charge.

## Milwaukee

MILWAUKEE, Feb. 11.

AUTOMOTIVE industries appear the most aggressive buying interest in the machine-tool market, although inquiry is broadening and the general aspect of business is improving steadily. Local dealers are figuring on the used tool needs of the Chicago, Milwaukee & St. Paul, but beyond this little railroad business is before the local trade. Manufacturers of woodworking machinery are reported to be exceptionally busy. Definite information concerning the needs of the Nash Motors Co. in retooling the former Mitchell automobile works at Racine, Wis., is promised early next week and undoubtedly will form a material aggregate.

The Common Council, Black River Falls, Wis., is asking bids until March 17 for the complete construction, erection and equipment of two water well systems to produce from 300,000 to 500,000 gal. in 24 hr. Vertical electric motors, with automatic starters, centrifugal pumps and appurtenances will be required. The consulting engineer is W. G. Kirchoffer, Madison, Wis. Harry Boyer is city clerk.

The Hornburg Motor Co., Hartland, Wis., has plans for a \$20,000 public garage, with service and repair shop, 50 x 122 ft., part two stories and basement. The architects are Eschweiler & Eschweiler, 141 Wisconsin Street, Milwaukee. Work is to start about March 15.

The Fox Motor Sales Co., 107 East Dety Street, Madison, Wis., Hupmobile distributor, will take bids after Feb. 15 through Philip M. Homer, local architect, for a two-story brick and concrete garage and service building, 72 x 155 ft., estimated to cost \$65,000 with equipment. Neil W. Fox is president and general manager.

The Marathon Battery Co., Wausau, Wis., incorporated early in December with \$150,000 capital stock, is completing the equipment of a plant in a leased building for the production of wet and dry batteries. Some items remain to be purchased. E. A. Fuller, mechanical engineer, formerly associated with the Gisholt Machine Co., Madison, and Edgar J. McEachron, formerly with the French Battery & Carbon Co., Madison, are in general charge.

The Montreal Mining Co., Hurley, Wis., subsidiary of Oglebay, Norton & Co., has plans by Edward W. Hopkins, range manager, for a new pump house and equipment at the Montreal iron mine, village of Hamilton, Iron County, which will require seven two-stage, 200-gal. per min. centrifugal pumps, with motors and automatic starters. Bids will be taken about Feb. 20.

The A. O. Smith Corporation, Milwaukee, has let contracts for several extensions of its automotive parts works at Twenty-seventh and Hopkins Streets, and is expected to close steadily on various items contained in a list of tools and other equipment issued in December.

The Frankenberg Refrigerating Machinery Co., 345 Jackson Street, Milwaukee, manufacturer of household and commercial refrigerating units, has increased its capital stock from \$50,000 to \$75,000 and will take additional space to increase production. William Linx is president and treasurer, and Julius Frankenberg, chief engineer.

The Edwards Motor Car Co., 3601-3605 Grand Avenue, Milwaukee, distributor of Dodge Brothers cars, will erect a one-story annex, 100 x 200 ft., to its two-story sales and service building of similar dimensions. The additional space will be used for general machine shop, service and repair departments, and will require considerable new machinery. Frank J. Edwards is president and general manager.

The Common Council, LaCrosse, Wis., is considering the electrification of the municipal waterworks pumping station and retaining the present steam pumping equipment for emergency use. The plan calls for the installation of three centrifugal pumps of 3,000,000 to 4,000,000 gal. capacity per

day, each, current for the operation of direct-connected motors to be purchased from a central station. A decision is expected shortly.

The Litnum Bronze Co., Menomonee, Wis., manufacturer of castings by a patented formula, is planning to add more melting capacity and may build an addition to its foundry and machine shop during the year. H. C. Inenfeldt is president.

The Gould Mfg. Co., Oshkosh, Wis., manufacturer of hardwood doors, interior trim and fancy millwork, will invest about \$100,000 in erecting an addition and buying equipment for a new toy factory, 80 x 174 ft., two and three stories, to contain also a battery of dry kilns.

Matt Stark, Fifty-third Street and Blue Mound Road, Wauwatosa, Wis., will start work about March 15 on the erection of a garage, sales and service building, 100 x 192 ft., one-story and part basement, at Fifty-fifth Street and Blue Mound Road, estimated to cost \$60,000 complete.

## Chicago

CHICAGO, Feb. 11.

THE Santa Fé has issued inquiries for 48 additional machines, making a total of 100 on which it has thus far asked for prices. The Great Northern has closed for a number of machine tools, involving a total outlay of about \$30,000. Inquiries from industrial companies are numerous, although actual buying still lags. The National Plate Glass Co. has revived an inquiry for 11 machine tools for a repair shop at its new plant at Ottawa, Ill., and is expected to place orders soon. It is understood that the A. O. Smith Corporation, Milwaukee, has placed a few additional items against its extensive list. The Buda Co., Harvey, Ill., has purchased a large frog and switch planer. The Elgin National Watch Co., Elgin, Ill., has closed for a 14-in. and two 16-in. engine lathes. The Milwaukee Die Casting Co., Milwaukee, Wis., has ordered a 16-in. shaper.

The Nash Motors Co., Kenosha, Wis., has not yet formulated definite plans for the utilization of the Mitchell Motors Co. plant, Racine, which it recently purchased. There continues to be some interest in used equipment, two inquiries from down State involving \$10,000 and \$5,000 worth of tools respectively, and one from Wisconsin, amounting to about \$7,000.

### Additions to Santa Fé List

- One 4½-in. Cleveland, or equivalent, motor-driven full turret lathe.
- One 48-in. x 16-ft., Boye & Emmes, or equivalent, triple-gear, heavy duty type motor-driven engine lathe.
- One hydraulic hand-power bushing press.
- One boiler plate flanging clamp, 10-ft. between housings.
- One Hartz, or equivalent, pneumatic flue welding machine, capacity 2-in. to 4½-in. flues inclusive.
- One boiler plate flanging clamp 20-ft. between housings.
- One 54-in. Niles, or equivalent, motor-driven truck and trailer tire turning lathe.
- One 26-in. Dill, or equivalent, heavy duty motor-driven crank slotter.
- One No. 4 Cincinnati, or equivalent, high-power motor-driven vertical milling machine.
- One No. 5 Cincinnati, or equivalent, horizontal plain high-power motor-driven milling machine.
- One motor-driven swedging machine for swedging ends of locomotive flues, capacity 2 to 5½-in. flues inclusive.
- One No. 4 Cincinnati, or equivalent, universal horizontal high-power motor-driven milling machine.
- One Lucas No. 33, or equivalent, horizontal motor-driven boring, milling and drilling machine.
- One 42-in. Colburn, or equivalent, heavy duty motor-driven boring mill.
- One 50-in. Colburn, or equivalent, motor-driven heavy duty boring mill.
- One 100-in. Cincinnati, or equivalent, motor-driven heavy duty boring and turning mill.
- One 30-in. x 24-ft. Lodge & Shipley, or equivalent, motor-driven geared-head lathe.
- One motor-driven pipe machine, capacity 1¼ to 6 in.
- One motor-driven 36-in. draw cut shaper.
- One 36 x 36-in. x 12-ft. Gray, or equivalent, heavy duty motor-driven planer.
- One motor-driven 8-in. cold saw.

One motor-driven No. 2 Oster, or equivalent, pipe cutting off machine.

One motor-driven Landis, or equivalent, heavy duty type piston or rod grinding machine.

One motor-driven 22-in. x 12-ft. heavy duty geared head engine lathe.

One motor-driven multiple punching machine, capacity for punching 36½-in. holes on 1½-in. centers in 14 gage iron.

One Niles, or equivalent, motor-driven two-spindle drilling and boring machine capacity not less than 3-in. high speed drill in steel.

One 24-in. back-gear motor-driven shaper.

Two triple head staybolt and radial stay threading machines, motor-driven.

Two motor-driven flue cutters for cutting safe ends on locomotive tubes, capacity to 5½-in. tubes inclusive.

One 20-in. x 6 ft. motor-driven single wood surfacer.

One motor-driven 3½-in. upsetting and forging machine.

One 36-in. motor-driven band saw.

One motor-driven 42 x 42-in. x 20 ft. Gray heavy duty planer, or equivalent.

One motor-driven cornice brake, capacity ¾-in. sheets 12 ft. wide.

One combination motor-driven rip and cut off saw, No. 4 American or equivalent.

One style 60 Heald, or equivalent, motor-driven grinding machine.

Two motor-driven polishing machines for polishing exterior of locomotive flues 2 in. in diameter up to 5½ in.

One belt-driven nut facing machine, ¾ to 3 in. capacity.

One 18½-in. x 6-ft. belt-driven Warner & Swasey, or equivalent, cabinet brass turret lathe.

One motor-driven No. 3 Wilmarth & Morman, or equivalent, full automatic surface grinder.

One motor-driven angle iron bending roll, capacity up to ½ x 4 x 4 in.

One 42-in. boring mill.

One 48 x 48 in. planer, 12 ft. bed.

One 60-in. draw-cut shaper and one locomotive.

One locomotive link grinder.

### National Plate Glass Co., Ottawa, Ill.

(All machines to be motor-driven)

One 25-in. shaper.

One No. 4 plain milling machine.

One 48 x 48-in. x 16-ft. planer.

One 4-ft. radial drill.

Two 30-in. engine lathes.

One 18-in. engine lathe.

One 14-in. engine lathe.

One 3-in. universal horizontal boring mill.

One 21-in. upright drill.

One 12-in. hack saw.

F. E. Davidson, 53 West Jackson Boulevard, Chicago, has prepared plans for a manufacturing plant at the corner of Sixteenth Street and Forty-sixth Court, Cicero, Ill., for the American Bolt Corporation, to cost \$500,000. It will comprise a group of buildings, embracing machine shop, carpenter shop, cold finish shop, hot finish department, boiler house, transformer, pump, storage and shipping rooms, and an office building.

The Morden Frog & Crossing Works, 208 South La Salle Street, Chicago, has had plans drawn by George C. Nimmons & Co., 122 South Michigan Avenue, for a one-story machine shop and saw mill addition, 100 x 240 ft., at Chicago Heights, Ill., to cost \$100,000.

The Whiting Corporation, Harvey, Ill., has booked the following orders for foundry equipment: Four cupola charging machines for the Singer Mfg. Co., Stanhope, N. J.; one No. 8 cupola for the National Cast Iron Pipe Co., Birmingham.

The Elgin Radio Corporation, 64 North State Street, Elgin, Ill., recently incorporated with \$5,000 capital stock, was organized for the purpose of acting as a sales organization to market the radio products which the Elgin Tool Works has been manufacturing for the past two years. The officers of the new company are the same as those of the Elgin Tool Works, Inc.

The Protectolarm, Inc., 1201 Cortland Street, Chicago, recently incorporated, has leased 13,000 sq. ft. of factory space at the address given and will manufacture fire and burglar alarms, alarm locks for doors and drawers, jewel and bond boxes, filing cabinets, etc. The company is not in the market for metal-working equipment. The officers are: President, E. A. Webber, vice-president, W. H. Beekman; treasurer, William C. Hayes; factory manager, W. J. Williams.

The Stampograph Co., 549 West Washington Boulevard, Chicago, recently incorporated, will market a machine for record-keeping in large industrial plants. It will not maintain a plant, but plans to contract for the manufacture of its product.



The Ideal Process Co., 2512 West Twenty-fourth Street, Chicago, recently incorporated with \$25,000 capital stock, will manufacture printers' rollers. The officers are: President, Walter Schuttler; vice-president, O. Linder; secretary, E. Byron Davis; treasurer, Walter Schuttler.

The Universal Sign Co., manufacturer of electric signs, Hibbing, Minn., plans to erect a new factory.

The Baker Valve Co., 1855 East Twenty-eighth Street, Minneapolis, Minn., is planning to rebuild its foundry destroyed by fire Jan. 28, with loss of \$25,000.

The Common Council, Wyoming, Iowa, has tentative plans for the construction of a municipal electric light and power plant to cost approximately \$40,000.

The Public Service Co. of Colorado, Denver, is arranging a fund of \$4,221,000, for extensions in generating plants and system during the year. Of this amount, \$2,221,000 will be used in the Denver district and \$2,000,000 in northern Colorado and in the Cheyenne, Wyo., territory.

The St. Cloud Public Service Co., St. Cloud, Minn., is planning to rebuild the portion of its generating plant destroyed by fire Feb. 6, with loss estimated at \$90,000 including machinery.

## St. Louis

ST. LOUIS, Feb. 11.

**T**ENTATIVE plans are being considered by the Common Council, Decatur, Ark., for the construction of a municipal electric power plant to cost \$80,000.

The Measuregraph Co., 1821 Olive Street, St. Louis, has awarded a general contract to the Cunliffe Co., 4935 Delmar Avenue, for a two-story addition, 80 x 180 ft., to cost approximately \$50,000. Oliver J. Popp, Odd Fellows Building, is architect.

The Consumers' Light & Power Co., Ardmore, Okla., is being acquired by the Cities Service Co., 60 Wall Street, New York, operated by Henry L. Doherty & Co., same address, for \$3,000,000. The new owner plans for extensions and the installation of additional equipment.

Samuel Yaffe, Fort Smith, Ark., has leased a building at B and North Tenth Street, and will remodel for a machine shop, including lathes, drill press, bench tools, etc. A company is being organized to operate the plant.

The Searcy Cotton Compress Co., Searcy, Ark., has tentative plans for rebuilding the portion of its plant recently destroyed by fire with loss of \$350,000 including machinery.

Bids will be received by James M. Burke, city clerk, Carthage, Mo., until Feb. 19, for three motor-driven centrifugal pumps, and one motor-driven diaphragm sludge pump, for a new sewerage disposal plant. Charles A. Haskins, Finance Building, Kansas City, Mo., is consulting engineer.

The Louisiana Pure Ice & Supply Co., Louisiana, Mo., is having plans prepared for a cold storage plant addition to cost about \$75,000. H. C. Reiff, East St. Louis, Ill., is engineer.

The Isme-Schilling Sash & Door Co., 2016 Papin Street, St. Louis, has awarded a general contract to the Cunliffe Co., 4935 Delmar Avenue, for a two-story and basement mill, 65 x 125 ft.; three-story building, 100 x 225 ft.; and two-story office, estimated to cost \$200,000 with machinery.

The Union Electric Light & Power Co., St. Louis, is arranging a fund of about \$5,000,000 for extensions in its generating plant during the year. Louis R. Egan is president.

The City Commission, Newkirk, Okla., plans the installation of electric-operated pumping machinery in connection with proposed extensions in the waterworks, estimated to cost \$100,000.

The Enterprise Mining Co., Miami, Okla., has tentative plans for the installation of a new concentrating plant and power house, two-stories, 50 x 125 ft., estimated to cost \$100,000 with machinery.

The Leggett & Platt Spring Bed & Mfg. Co., 219 West Second Street, Carthage, Mo., will commence the erection by day labor of its one-story and basement addition, 80 x 400 ft., estimated to cost \$55,000 with equipment. Percy K. Simpson, Center Building, is architect.

Manual training equipment will be installed in the new high school to be erected at Caruthersville, Mo., estimated to cost \$200,000, for which bids will soon be asked on general contract. The Board of Education is in charge.

The Common Council, Nowata, Okla., plans the installation of electric-operated pumping machinery in connection with waterworks extensions, to cost \$75,000. The Benham Engineering Co., Gumbel Building, Kansas City, Mo., is consulting engineer.

The Brock Engineering Co., Inc., 698 Arcade Building, St. Louis, recently organized with capital stock of \$100,000 to manufacture mechanical feed-water purifiers for boilers,

is interested in pipe-cutting, threading and bending machines. Its tanks, which will be built of marine and flange steel, will be made under contract. Awards are yet to be made. An assembling plant is sought in St. Louis. H. J. Sternberg is president, and E. J. Brock, vice-president and general manager.

The Pittsburg Boiler & Machine Co., Pittsburg, Kan., is in the market for a 10½ or 12½-ft. pneumatic riveter for driving up to 1-in. steam tight rivets.

## Cincinnati

CINCINNATI, Feb. 11.

**O**RDERS for single tools continue in fair volume, but the machinery market generally is quiet. Inquiry, however, continues heavy, and indications point to good business shortly. The automotive industries have been fair buyers, the various units of the General Motors Corporation especially being active. The Reo Motor Car Co. also has been a purchaser, while two of the large electrical companies have been in the market for various plants.

Railroad buying is rather light. Two lists issued last week, however, are looked upon as the forerunner of several large ones to be out shortly. Shop schedules are being maintained, and it is confidently expected that this year will see a much greater volume of business than last year. Prices are steady, with a tendency to advance.

The Federal Government has granted permission to the Cincinnati River-Rail Transportation Co. to construct concrete piling outside the harbor line of the Ohio River bank for the proposed river-rail terminal to be erected at the foot of Harriet Street. A large gantry crane will be installed and a trestle 1200 ft. long will be erected. Julian A. Pollock is president.

The Wickham Piano Plate Co., Springfield, Ohio, has awarded contract to the H. K. Ferguson Co. for a new one-story foundry containing 12,000 sq. ft. of floor space. Traveling cranes, in addition to the most modern foundry equipment, will be installed. The new plant will be ready for operation about April 15. John C. Wickham is president.

The Kentucky Northern Power Co., Falmouth, Ky., has been granted a permit to erect a dam on the Licking River, to develop 35,000 hp. Bids for the construction work will probably be asked in the spring.

The Krein Chain Co., Wapakoneta, Ohio, is planning the adoption of electric welding to replace gas and oil fire welding. The Krein company is owned by the L. D. Round Co., Cleveland, which also operates chain plants at Cleveland and Seattle. It is understood that the adoption of electric welding at the Krein plant is the first step in the consolidation of the various units of the organization at one point. W. G. Holley is manager of the company.

Electrical pumping machinery and auxiliary equipment will be required for the addition contemplated to the municipal waterworks at Jellico, Tenn., estimated to cost \$25,000. The City Council is in charge.

The Rieck Sheet Metal Co., Dayton, Ohio, has purchased a site with existing building on Pine Street for \$50,000, and will remodel for a new plant. Plans are also in progress for a one-story addition.

The Warner Elevator Mfg. Co., Spring Grove Avenue, Cincinnati, is planning the installation of a milling machine for cutting worm gears.

The Louisville Gas & Electric Co., Louisville, is disposing of an additional bond issue of \$2,500,000, a portion of the proceeds to be used for extensions in generating plant and system.

The Mills Equipment Corporation, Chattanooga, Tenn., is in the market for a number of mine cars, each about 1 ton capacity, 36-in. gage.

The Board of Commerce, Harriman, Tenn., A. R. Davis, secretary, has inquiries out for crushing machinery, screens, conveyors, power equipment, etc.

The Rockwood Stove Works, Inc., Rockwood, Tenn., is said to be planning the installation of additional equipment for a new department to manufacture hot-blast heaters and castings. Harry Howard is general manager.

The Board of Works, Nashville, Tenn., is planning for the construction of a two-story automobile service and repair building, 150 x 750 ft., for city motor trucks and cars, estimated to cost \$350,000 with equipment.

The Mills & Lupton Supply Co., 1146 Market Street,

Chattanooga, Tenn., machinery dealer, has inquiries out for a number of duplex pumps, 6 x 4 x 6 in.

The Fulton Co., Knoxville, Tenn., manufacturer of valves, temperature regulating equipment, etc., has awarded a general contract to J. M. Dunn & Son, Knoxville, for a two-story plant adjoining the present works, to cost \$55,000. It is proposed to move the existing equipment in the new building, with additional machinery to be purchased. W. M. Fulton is president.

Bids will be received by the United States Engineer Office, Louisville, until Feb. 21, for 14 three-drum hoisting engines, 7 independent swinging engines and 7 lever stands, circular 24-192.

The Signal Mountain Portland Cement Co., James Building, Chattanooga, Tenn., is considering plans for additional units at its mill at Signal Mountain, Tenn., to cost \$400,000 with machinery.

The Ridley Phosphate Co., Ashwood, Tenn., is arranging for the installation of a plant on about 200 acres of phosphate lands, including mechanical washing, grinding, drying equipment, etc. C. W. Alexander is secretary.

## South Atlantic States

BALTIMORE, Feb. 11.

**T**HE Fowler Refrigerating Machine Corporation, Munsey Building, Baltimore, recently formed with a capital of 50,000 shares of stock, no par value, is perfecting plans for a factory to manufacture a popular-priced refrigerating machine for domestic service. Fleming B. Fowler is chairman of the board; William E. Schaefer, president; and Herbert W. Schaefer, secretary and treasurer.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has plans for a three-story addition, 65 x 113 ft., to its No. 3 generating plant at Race and Barney Streets, to cost \$300,000 with equipment.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until March 4 for a quantity of twist drills, hand drills, files, machinists' hammers, scaling hammers, carbon steel drills, screw-drivers, gasoline torches, etc., for the Brooklyn, Mare Island, Hampton Roads, Puget Sound and San Diego navy yards, schedule 1879; until Feb. 26 for miscellaneous pliers for Eastern and Western yards, schedule 1869; until March 4 for wrenches for Eastern and Western yards, schedule 1878, and 10,500 lb. steel welding wire for the Mare Island yard, schedule 1881.

The Lindsay Mfg. Co., Greenville, S. C., recently organized, plans for the establishment of a factory to manufacture ice-making machinery. R. F. Lindsay is head.

The Oles Envelope Co., 514 East Lombard Street, Baltimore, will take bids at once for a one-story addition, 80 x 250 ft., to cost about \$65,000, at Ridgely and Ostend Streets.

D. C. Elphinstone, 408 Continental Building, Baltimore, machinery dealer, is in the market for a single drum hoisting engine, 3000 to 5000 lb. capacity, gasoline-operated; one 50 to 100-hp. portable boiler with engine; one 25-hp. motor, three phase, 60 cycle, 440-volts; one 8 to 12-ton locomotive, 36-in. gage, Shay type, and one belt-driven air compressor, 150 to 250 cu. ft. capacity.

The Victory Sparkler & Specialty Co., Elkton, Md., has plans for a one-story foundry for iron castings, to cost approximately \$50,000 with equipment.

The Bureau of Foreign and Domestic Commerce, Washington, has information regarding a company at Bogota, Colombia, in the market for gas furnaces, suitable for melting metals, reference No. 9067; of a concern at Balboa, Spain, desirous of purchasing machinery for the manufacture of tin boxes, etc., to be electrically-operated, reference No. 9014; of a company at Santiago, Chile, in the market for refractory brick, reference No. 9030; and a company at Shanghai, China, desirous of purchasing flat-head wood screws, and round wire nails, countersunk, reference 9013.

The Pigeon River Power Co., Waynesville, N. C., will construct and operate a hydroelectric generating plant on the Pigeon River, with capacity of 60,000 hp., to cost \$400,000. F. R. Weller, Mills Building, Washington, is consulting engineer.

The Carolina Power & Light Co., Raleigh, N. C., is disposing of a bond issue of \$1,000,000, a portion of the proceeds to be used for extensions. William Darbee is vice-president.

The Etheridge Motor Co., Charlotte, N. C., has awarded a general contract to the Southeastern Construction Co., Charlotte, for a two-story service and repair building, 55 x 235 ft., estimated to cost \$100,000 with equipment.

Lockwood, Greene & Co., Charlotte, are architects and engineers. Lane Etheridge is president.

The Galax Knitting Co., High Point, N. C., plans for the construction of an electric power plant at its proposed mill at Galax, Va., to cost approximately \$70,000. C. C. Robbins is general manager.

The Eagle Engineering Co., New Bern, N. C., is in the market for rock crusher, with jaw opening from 25 to 30 in., capacity about 30 tons per hr., second-hand, in good condition.

The general purchasing officer, Panama Canal, Washington, will receive bids until Feb. 29 for a quantity of wire and cable, copper nails, steel conduit and elbows electrical equipment, electric drills, foundry brushes, etc., circular 1588.

The Clay Products Co., Richmond, Va., care of W. L. Riggleman, secretary, has acquired a site near the city limits and contemplates the construction of a plant to manufacture bricks, tile, etc., with power house, estimated to cost \$100,000 with equipment. A fuel oil burning system for kilns will be installed.

W. L. Duncan, 347 Arcade Building, Norfolk, Va., is desirous of getting in touch with manufacturers of steel chutes for handling boxes, bales, etc.

R. P. Johnson, Wytheville, Va., machinery dealer, has inquiries out for two industrial locomotives, one 30 to 40 tons capacity, 42-in. gage, the other of like size, 36-in. gage, Heisler, Climax or Shay types.

The Junction City Sand Co., Junction City, Ga., has inquiries out for a 500 ft. span cableway,  $\frac{3}{4}$  to  $\frac{1}{2}$ -in. rope; also for a clamshell bucket, 1 or  $\frac{3}{4}$ -yd. capacity, with or without trolley.

Manual training equipment will be installed in the high school to be erected at Maxton, N. C., estimated to cost \$100,000, for which plans will be prepared by L. M. Boney, Wilmington, N. C., architect. The Robeson County Board of Education, Lumberton, N. C., is in charge.

The Self Loading Truck Attachment Co., West End, N. C., incorporated with \$100,000 capital stock, will manufacture by contract truck bodies equipped with machinery for loading. It is possible that the company will do part of its work later. Considerable machinery and equipment will be built by contract, but that for the plant is not yet in demand. J. B. Von Canon is president and treasurer.

The Mallory Machinery Corporation, Baltimore, is in the market for a 20 or 30-ton, 8-wheel standard gage crane. It also needs 2 drum and swinger, or three drum steam hoists, and two drum and swinger or three drum electric hoists, with not less than 50-hp., a. c. motors.

## Buffalo

BUFFALO, Feb. 11.

**T**HE Power Corporation of New York, Herring, N. Y., affiliated with the Northern New York Utilities, Inc., Watertown, N. Y., is disposing of a bond issue of \$1,000,000, a portion of the proceeds to be used in connection with a new hydro-electric generating plant with additional capacity of about 5000 hp. The company will also develop another generating station of similar output.

A manual training department is being considered in the new junior high school to be erected at Broad Avenue and Robinson Street, Binghamton, N. Y., estimated to cost \$500,000, for which T. I. Lacey & Sons, Kilmer Building, are architects.

The Wood Fibre Products Co., Corning, N. Y., affiliated with the Corning Glass Works, Walnut Street, contemplates the erection of a one-story plant, 100 x 300 ft., to cost \$60,000 with machinery. A. M. Tietzel is company engineer.

The Board of Trustees, Lyndonville, N. Y., will take bids until Feb. 19, for a pumping plant, steel water tank and tower and auxiliary equipment, in connection with a municipal waterworks system. Hopkins & Field, 349 Cutler Building, Rochester, N. Y., are engineers. Donald M. Fraser is village clerk.

The Niagara Falls Power Co., Niagara Falls, N. Y., will increase the capacity of its hydroelectric generating plants during the present year by about 140,000 hp.

The Rochester Gas & Electric Co., Rochester, N. Y., will build a new steam-operated power plant during the year, with capacity of 50,000 hp.

Manual training equipment will be installed in the proposed two-story high school to be erected at Dunkirk, N. Y., estimated to cost \$500,000, for which bids will be asked on general contract within a few days. E. E. Joralemon, 482 Delaware Avenue, Buffalo, is architect.

The Warren Axe & Tool Co., Warren, Pa., has acquired the plant and business of the Romer Axe & Tool Co., Dunkirk, N. Y., closed for a number of months. The new



owner will soon resume production, following improvements, operating as the Romer Division of the company, giving employment to about 100 men.

The Ross Heater & Mfg. Co., 1407 West Street, Buffalo, will commence the construction of a one and two-story addition to its machine shop, 32 x 76 ft.

Bids will be received by the Commissioner of Public Works, Municipal Building, Buffalo, until Feb. 28, for centrifugal pumps and motors, electric switchboard and switchboard apparatus for the low-lift pumping station at the new filtration plant, as per plans on file at the office of the engineer, filtration division, bureau of water. Fuller & McClintock, 170 Broadway, New York, are consulting engineers.

The Tonawanda Power Co., North Tonawanda, N. Y., will make extensions and improvements in its plant and system, including the installation of new 60,000-volt equipment to replace existing 22,000-volt apparatus.

The Simonds Saw & Steel Co., Lockport, N. Y., has ordered an 8-ton steam hammer from the Chambersburg Engineering Co., Chambersburg, Pa.

The Corning Fibre Box Corporation, Box 354, Corning, N. Y., incorporated with \$125,000 capital stock, will occupy a building 100 x 300 ft., to be erected by the Corning Chamber of Commerce. Bids for construction are now open. Between 12 and 15 machines will be installed, consisting of slotters, single and double facing machines, slitters, tapping machines, stitchers and die cutting machines. Charles Roehm is president and general manager and John L. Thomas, vice-president.

## Gulf States

BIRMINGHAM, Feb. 11.

CONSTRUCTION will soon commence on a one-story addition to the foundry of the Tennessee Coal, Iron & Railroad Co., Birmingham, at Fairfield, Ala., to increase the output about 50 per cent. George G. Crawford is president.

The Standard Agricultural & Chemical Corporation, Fellsmere, Fla., recently formed by a merger of the Alphano Humus Co., 17 Battery Place, New York, and the Fellsmere Farms Co., Fellsmere, has commenced the erection of a new plant for the manufacture of fertilizer products. An electric generating plant will be installed. The works will cost \$375,000, including equipment. E. P. Decker is engineer, and Ellis Soper, Fellsmere, consulting engineer.

The post quartermaster's office, Fort Sam Houston, Tex., will take bids until Feb. 19 for oil burners and equipment for five boilers at Argonne Heights, and two boilers at the local power house.

The R. B. George Machinery Co. and the New Moline Plow Co., Dallas, Tex., have been consolidated under the name of the Moline-George Co., with capital of \$400,000. Plans are under way for extensions. R. B. George is president and general manager; and J. D. Clark, secretary.

The Texas Power & Light Co., Dallas, Tex., is disposing of a bond issue of \$1,300,000, a portion of the proceeds to be used for extensions in plant and system. E. W. Hill is vice-president.

The National Bottled Drink Cooler Co., Mobile, Ala., has inquiries out for a set of bending rolls to handle galvanized sheets, 22-gage or lighter. E. C. Grace is head.

The United States Engineer Office, Florence, Ala., will take bids until March 4 for two motor-generator sets, one rotary converter, six 500 kva. transformers, one switchboard, one storage battery, and one high potential testing set for the Wilson dam power plant, circular 24-349.

The Mayhew Produce Co., Brady, Tex., has purchased a local site and will have plans drawn for an ice-manufacturing and cold storage plant to cost approximately \$60,000.

In addition to a new plant at Sanford, Fla., now in course of construction, the Florida-McCracken Concrete Pipe Co., of that city, has acquired a site at Tampa, Fla., and will soon break ground for another works for the production of concrete sewer pipe, estimated to cost \$65,000. The Sanford plant will cost \$80,000 with machinery. The company was organized recently with capital of \$300,000. W. J. McCracken is head, P. O. Box 872, Sanford.

The West Texas Utilities Co., Abilene, Tex., has entered into agreement with the Wichita Falls Electric Co., Wichita Falls; West Texas Electric Co., Sweetwater; Texas Power & Light Co., Brownwood, and the Oil Belt Power Co., Eastland, Tex., for an exchange of power, and will make extensions and improvements with installation of additional equipment estimated to cost \$600,000, including line construction by the other companies noted.

Allen & Cory, Inc., Quincy, Fla., is having plans prepared

for an ice-manufacturing plant in conjunction with a hydroelectric generating station to be constructed on the Little River. Bids for equipment will soon be asked. The Southern Engineering Corporation, Albany, Ga., is engineer.

G. T. Heard, Brooksville, Miss., is in the market for an ice-making machine and auxiliary equipment.

The River Falls Power Co., River Falls, Ala., has plans under way for the construction of a hydroelectric generating plant on the Conecuh River, with initial capacity of 7500 h.p., to cost approximately \$200,000 with transmission system. The Southern Engineering Corporation, Albany, Ga., is engineer.

The Frank Reigger Machine Co., Greenville, Tex., has awarded a general contract to Lee & Morgan, Greenville, for a one-story machine shop on Jordan Street, 54 x 100 ft.

The Texas & New Orleans Railroad Co., a subsidiary of the Southern Pacific Railroad, Houston, Tex., has plans for the construction of locomotive and car repair shops at Jacksonville, Tex., to cost approximately \$250,000. A power house will be built. H. M. Lull is chief engineer.

The A-B Accessory Co., Wichita Falls, Tex., is interested in locating a foundry to handle a contract for a quantity of small gray iron and round soft iron castings, averaging about 1 lb. each.

The Silvers Box Mfg. Co., Forney Avenue, Dallas, Tex., has plans for a two-story plant, 60 x 125 ft., to cost about \$85,000 with machinery, for which foundations will be laid at once.

The Imperial Oil Co., Tampa, Fla., has preliminary plans for the construction of an oil storage and distributing plant at Jacksonville, Fla., to cost \$250,000 with machinery. It is also reported to be planning for similar works at Miami and Pensacola.

The Southern Railway Co., Cincinnati, will soon break ground for a new locomotive erecting shop at Birmingham, to cost approximately \$150,000. A woodworking plant will be built on adjoining site.

The Alabama Clay Products Co., 600 Farley Building, Birmingham, has inquiries out for transmission equipment for its plant at Ensley, Ala., including cast iron split and solid pulleys, cast steel pulleys, shafting, etc.

The Texas Laundry Machinery Co., Blue Stett Street, San Antonio, Tex., plans for an addition to its factory, and the installation of additional equipment estimated to cost \$45,000.

## Indiana

INDIANAPOLIS, Feb. 11.

PLANS are nearing completion for a one-story machine shop at the plant of the Bucyrus Co., Evansville, Ind., manufacturer of steam shovels, dredging machinery, etc. Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, is architect. Headquarters of the company are at South Milwaukee, Wis.

The Prather-Chevrolet Co., Indianapolis, local representative for the Chevrolet automobile, will install a machine and repair shop in its new one-story service building at 650-52 Virginia Avenue, for which a general contract has been awarded to the Pierson Construction Co., Indianapolis.

The Home Ice Co., Bedford, Ind., has preliminary plans for a one-story ice-manufacturing plant, estimated to cost \$55,000 including equipment. Foundations will soon be laid.

Charles E. Keel, Indianapolis, is perfecting plans for the installation of a machine shop in the building at 108 East Morris Street, recently acquired.

Manual training equipment will be installed in the two-story and basement high school to be erected at Sullivan, Ind., estimated to cost \$150,000, for which bids are being asked on a general contract until Feb. 27. John P. Bayard, 231½ Main Street, Vincennes, Ind., is architect.

A two-story automobile service and repair building, 95 x 120 ft., for company motor trucks and cars, to cost approximately \$60,000, will be constructed by the Ideal Dairy Co., Seventh Street and Pennsylvania Avenue, Evansville, Ind., for which plans are being drawn by A. E. Neucks, Peoples' Savings Bank Building, architect.

The Allen A. Wilkinson Lumber Co., East Michigan Street, Indianapolis, has preliminary plans for the rebuilding of the portion of its planing mill destroyed by fire, Feb. 3, with loss estimated at \$90,000, including machinery and electric equipment.

The Jasper Wood Products Co., Jasper, Ind., recently organized with a capital of \$100,000, is planning the erection of a factory to manufacture kitchen cabinets and kindred specialties, to cost \$60,000 with equipment. Clarence U. and Claude A. Gramelspacher and Andrew W. Berger, all of Jasper, are heads.

# Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates	
Bars:	Per Lb.
Refined iron bars, base price.....	3.54c.
Swedish charcoal iron bars, base.....	7.00c. to 7.25c.
Soft steel bars, base price.....	3.54c.
Hoops, base price.....	5.19c.
Bands, base price.....	4.39c.
Beams and channels, angles and tees, 3 in. x ½ in. and larger base.....	3.64c.
Channels, angles and tees under 3 in. x ½ in., base.....	3.54c.
Steel plates, ¼ in. and heavier.....	3.64c.

Merchant Steel	
Tire, 1½ x ½ in. and larger.....	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger).....	4.10c.
Toe-calk, ½ x ¾ in. and larger.....	4.60c.
Cold-rolled strip, soft and quarter hard.....	7.50c. to 8.50c.
Open-hearth, spring steel.....	4.50c. to 7.50c.
Shafting and Screw Stock:	
Rounds.....	4.40c.
Squares, flats and hex.....	4.90c.
Standard tool steel, base price.....	15.00c.
Extra tool steel.....	18.00c.
Special tool steel.....	23.00c.
High-speed steel, 18 per cent tungsten.....	75c. to 80c.

Sheets	
No. 10.....	4.34c.
No. 12.....	4.39c.
No. 14.....	4.44c.
No. 16.....	4.54c.

Boz Annealed—Black	
	Per Lb.
Nos. 18 to 20.....	4.40c. to 4.55c.
Nos. 22 and 24.....	4.45c. to 4.70c.
No. 26.....	4.50c. to 4.75c.
No. 28*.....	4.60c. to 4.85c.
No. 30.....	4.80c. to 5.05c.

Galvanized	
No. 14.....	4.70c. to 4.95c.
No. 16.....	4.85c. to 5.10c.
Nos. 18 and 20.....	5.00c. to 5.25c.
Nos. 22 and 24.....	5.15c. to 5.40c.
No. 26.....	5.30c. to 5.55c.
No. 28*.....	5.60c. to 5.85c.
No. 30.....	6.05c. to 6.30c.

\*No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe	
Standard Steel	Wrought Iron
Black Galv.	Black Galv.
½ in. Butt... —41 —24	½ in. Butt... —4 +19
¾ in. Butt... —46 —32	¾ in. Butt... —11 +9
1-3 in. Butt... —48 —34	1-1½ in. Butt... —11 +6
2½-6 in. Lap... —44 —30	2 in. Lap... —5 +14
7-8 in. Lap... —41 —11	2½-6 in. Lap... —9 +9
9-12 in. Lap... —34 —6	7-12 in. Lap... —3 +16

Bolts and Screws	
Machine bolts, cut thread,	
45 and 10 to 50 and 10 per cent off list	
Carriage bolts, cut thread,	
35 to 35 and 10 per cent off list	
Coach screws.....	45 to 50 and 10 per cent off list
Wood screws, flat head iron,	
75, 20, 10 and 7½ per cent off list	

Steel Wire	
BASE PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic.....	4.75c. to 5.00c.
Annealed soft.....	4.75c. to 5.00c.
Galvanized annealed.....	5.40c. to 5.65c.
Coppered basic.....	5.40c. to 5.65c.
Tinned soft Bessemer.....	6.40c. to 6.65c.

\*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire	
	BASE PRICE
High brass sheet.....	17¼c. to 18¼c.
High brass wire.....	17¼c. to 18¼c.
Brass rods.....	15 c. to 16 c.
Brass tube, brazed.....	25¼c. to 26¼c.
Brass tube, seamless.....	21¼c. to 22¼c.
Copper tube, seamless.....	22¼c. to 23¼c.

Copper Sheets	
Sheet copper, hot rolled, 20 to 20¼c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates	
Bright Tin	Coke—14 x 20
Grade "AAA"	Grade "A"
Charcoal 14x20	Charcoal 14x20
IC.. \$12.55	\$10.70
IX.. 13.95	12.55
IXX.. 15.55	13.75
IXXX.. 17.10	15.30
IXXXX.. 18.85	16.80
	Prime Seconds
	80 lb.. \$6.55 \$6.30
	90 lb.. 6.65 6.40
	100 lb.. 6.75 6.50
	IC.. 7.00 6.75
	IX.. 8.25 8.00
	IXX.. 9.50 9.25
	IXXX.. 10.75 10.50
	IXXXX.. 12.00 10.75

Terne Plates	
8 lb. coating, 14 x 20	
100 lb. ....	\$7.00 to \$8.00
IC .....	7.25 to 8.25
IX .....	8.25 to 8.75
Fire door stock.....	9.00 to 10.00

Tin	
Straits pig.....	60c.
Bar.....	68c. to 70c.

Copper	
Lake ingot.....	15¼c.
Electrolytic.....	15 c.
Casting.....	14 c.

Spelter and Sheet Zinc	
Western spelter.....	7¼c.
Sheet zinc, No. 9 base, casks.....	10¼c. open 11¼c.

Lead and Solder*	
American pig lead.....	9½c. to 9¼c.
Bar lead.....	12c. to 13c.
Solder ½ and ½ guaranteed.....	37¼c.
No. 1 solder.....	35¼c.
Refined solder.....	31¼c.

\*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal	
Best grade, per lb.....	75c. to 90c.
Commercial grade, per lb.....	35c. to 50c.
Grade D, per lb.....	25c. to 35c.

Antimony	
Asiatic.....	12¼c. to 13c.

Aluminum	
No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.....	36c.

Old Metals	
	Cents Per Lb.
Copper, heavy crucible.....	11.00
Copper, heavy wire.....	10.50
Copper, light bottoms.....	9.00
Brass, heavy.....	6.00
Brass, light.....	4.75
Heavy machine composition.....	8.25
No. 1 yellow brass turnings.....	6.50
No. 1 red brass or composition turnings.....	7.75
Lead, heavy.....	7.25
Lead, tea.....	5.75
Zinc.....	4.00
Cast aluminum.....	17.00
Sheet aluminum.....	17.00